Ont. Dept. of Agriculture & Food
Southwestern Ontario Farmers' Week at Ridgetown College of Agricultural Technology

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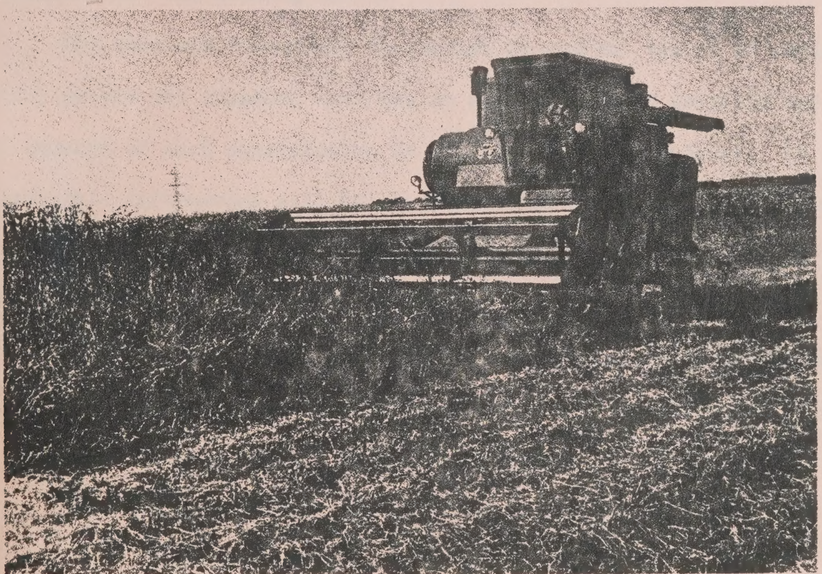
SUMMARY

SOUTHWESTERN ONTARIO FARMERS' WEEK
AT
RIDGETOWN COLLEGE OF AGRICULTURAL TECHNOLOGY



SOYBEANS, WHITEBEANS and WHEAT
Monday January 10, 1972

ONTARIO DEPARTMENT OF AGRICULTURE & FOOD
PARLIAMENT BUILDINGS, TORONTO

EVERETT BIGGS/DEPUTY MINISTER HON. WM. A. STEWART/MINISTER

FOREWORD

The Southwestern Ontario Farmers' Week is a result of the deliberations of many individuals beginning in early October. Most segments of the agricultural community of Southwestern Ontario are represented with the emphasis on the farming sector.

The sessions containing discussion on current topics of interest to many people are repeated each day so that as many as possible may participate. A summary of each presentation is contained in this booklet. It is hoped that this information will be of use to each and every farmer interested.

Among the organizations responsible for the planning of the 1972 Farmers' Week are:

Soil and Crop Improvement Associations, Milk Committees and Beef Improvement Associations of the Counties of Essex, Kent, Lambton, Elgin and Middlesex

Kent Vegetable Growers' Association

Essex Vegetable Growers' Association

Ontario Bean Producers' Marketing Board

Ontario Soya-bean Growers' Marketing Board

Ontario Department of Agriculture and Food

Harrow Research Station (Canada Department of Agriculture)

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If farmers should want to contact research personnel at the Harrow Research Station, or the Ridgetown College of Agricultural Technology, the staffs of both stations are listed with the specific area in which they conduct research.

Harrow Research Station

Canada Department of Agriculture

Department and Personnel	Area of Research
CHEMISTRY AND WEED SCIENCE	
Dr. G.M. Ward	Head of Section Greenhouse vegetable crops. Nutrition, production, biochemistry of tomatoes and cucumbers.
Dr. A.S. Hamill	Effect of herbicides on weed species and weed population shifts, influence of weed competition on crop yields.
Dr. P.B. Marriage	Herbicide physiology and persistence.
Dr. W.J. Saidak	Weeds, weed control, herbicide evaluation and herbicide translocation.
Dr. F.G. von Stryk	Pesticide chemistry. Residue analysis, systemic insecticides, fungicides, herbicides.
CROP SCIENCE	
C.G. Mortimore	Head of Section Corn breeding, stalk rot research, agronomic studies.
L.J. Anderson	Variety testing of corn, soybeans, and cereals.
Dr. J.W. Aylesworth	White bean breeding and production practices.
Dr. B.R. Buttery	Soybean physiology and biochemistry.
Dr. R.I. Buzzell	Soybean breeding and genetics, agronomic studies.
W.A. Scott	Burley tobacco management.
ENTOMOLOGY	
Dr. C.D.F. Miller	Head of Section Cereal and forage crop insects (Cereal leaf beetle - Alfalfa weevil)
Dr. W.M. Elliott	Vegetable insects (peach aphid, _Myzus persicae_) on potatoes.
Dr. W.H. Foott	Field crop and vegetable insects (Corn leaf aphid - Sap beetle)
Dr. R.P. Jacques	Insect pathology. (Cabbage looper - cabbageworm)
Dr. P.W. Johnson	Plant parasitic nematodes. (Root-knot nematode - lesion nematode on greenhouse vegetables)

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Department and Personnel	Area of Research
Entomology - continued	
Dr. R .J. McClanahan	Greenhouse insects. (Two-spotted spider mite - greenhouse whitefly, integrated control)
H.B. Wressell (Chatham)	Field crop and vegetable insects. (Insects on white beans, corn and tomatoes)
HORTICULTURAL AND SOIL SCIENCE	
Dr. J.M. Fulton	Head of Section The water requirements of crops, soil moisture, irrigation, evapotranspiration.
Dr. E .F. Bolton	Soil physics, cropping systems, cultivation, tillage, soil aeration and drainage.
Dr. W.I. Findlay	Soil fertility maintenance, build up and decline; crop fertilizer requirements, and time of application.
Dr. R.E.C. Layne	Tree fruit breeding. Winterhardiness. Disease resistance. Peach rootstocks.
V.W. Nuttall	Vegetable breeding. Genetics. Greenhouse and pickling cucumber breeding.
Dr. H.A. Quamme	Tree fruit breeding. Fireblight resistance of pear. Cold-hardy dwarfing rootstocks for pear.
PLANT PATHOLOGY	
Dr. C.D. McKeen	Head of Section Greenhouse and field vegetable diseases. Verticillium wilt. Evaluation of fungicides on vegetables.
Dr. B.N. Dhanvantari	Tree fruit diseases. Peach canker, bacterial leaf spot of peaches and apricots. Crown gall.
Dr. John Dueck	Bacterial diseases of fruit and vegetable crops. Fireblight of apple and pear. Bacterial spot of pepper.
Dr. L.F. Gates	Corn root and stalk rot and other corn diseases. Viruses of cereals and legumes.
Dr. J.H. Haas	White bean and soybean diseases. Bacterial blights, bronzing and root rots.
Dr. R.N. Wensley	Soil microbiology. Fusarium wilt and root rot diseases of melons, asparagus and other vegetable crops.

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Ridgetown College of Agricultural Technology

Ontario Department of Agriculture and Food

Department and Personnel	Area of Research
AGRICULTURAL ENGINEERING	
P.H. Bomford	Head of Department. Corn and Soybean harvest losses. Grain drying systems.
R.E. Clayton	Extension engineer (Kent County) in farm buildings, farm drainage and farm machinery.
M. Sojak	Environmental control (ventilation). Drainage systems (durability of plastic drains and drain maintenance. Specialized machinery.
BIOLOGY AND HORTICULTURE (and weed control)	
R.H. Brown	Head of Department. Evaluation of chemical weed control in corn, burley tobacco, asparagus, red beets, tomatoes and strawberries. Control of Quackgrass and fall panicum.
Dr. B. Bolwyn	Insect and disease control in corn (Northern corn blights, rootworm) white beans (white mold).
J.K. Muehmer	Variety evaluation and production techniques in processing crops (sweet corn, tomatoes, peppers, cucumbers).
J.E. Shaw	Evaluation of chemical weed control in soybeans, white beans, kidney beans, lima beans, cereal grains, alfalfa, cucumbers, potatoes. Control of velvetleaf, Jimsonweed, and Black Nightshade.
CROPS	
A.D. McLaren	Head of Department. Variety evaluation and production techniques in corn and forages.
R.C. Jenkinson	Variety evaluation and production techniques in cereals and winter wheat and spring wheat.
D.A. Littlejohns	Variety evaluation and production techniques in soybeans and white beans.
A.K. Brooks	Extension in Crop Production - Middlesex and Elgin Co.
W.W. Parks	Extension in Crop Production - East Kent and Lambton Counties.

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Department and Personnel	Area of Research
FARM MANAGEMENT AND ECONOMICS	
D. Beattie	Head of Department, Farm management and production economics of livestock.
S.J. Usher	Marketing agricultural products, agricultural policies, economics in swine production.
LIVESTOCK AND POULTRY	
D.G. Luckham	Head of Department. Nutrition and egg production, feeding broiler hatching flocks.
J.E. Core	Beef and Dairy rations. Stored feeding programs including stover silage, silage additives.
A.A. Campbell	Chemical components of feed.
J.R. Morris	Selection of swine breeding stock, herd health. Evaluation of additives (protein supplements, antibiotics.) Feeding of high moisture corn stored with organic acid to finishing hogs.
SOILS	
Dr. C.S. Baldwin	Head of Department. Plastic coated corn and spring wheat, nitrogen in spring wheat and white bean production.
R.W. Johnston	Calcium, magnesium, and micronutrients in field crops (corn, soybeans, white beans, and forages).
C.K. Stevenson	Evaluation of nitrification inhibitiors in the nitrogen fertilization of corn. Soil fertility maintenance, time of application of fertilizers.
VETERINARY SERVICES LABORATORY	
Dr. F.J. Harden	Head of Department. Assistance given in diseases of all classes of livestock.
Dr. R.E. Clugston	Assistance given in diseases of all classes of livestock.
Dr. D.A. Stevenson	Assistance given in diseases of all classes of livestock.
AGRICULTURAL LABORATORY TECHNOLOGY	
Dr. J.H. Brimner	Coordinator of course, chemical components of crops and feeds.
AGRICULTURAL SECRETARY	
R.C. Wagner	Coordinator of course. Farm accounting and agricultural policy.

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WHAT'S AHEAD FOR CASH GRAINS

J.S. Carmichael
C.D.A. Economics Branch, Ottawa

Soybeans

Production of soybeans in Ontario has grown from 1 million bushels during the war years to 7 million bushels in the late 1950's to 10 million bushels in 1970. While the low yields for the harvest just completed resulted in less than 10 million bushels, the increased plantings of 360,000 acres would have resulted in well over 10 million bushels in a more normal year. This leaves us short of producing all the soybeans we process. In 4 of the last 5 years we have imported an average of nearly 16 million bushels of beans - and the first 9 months' experience in 1971 at 10.3 million suggests only a small reduction. We imported meal in 1969 and 1970 in excess of the amounts exported by another 4 or 5 million bushels if we converted meal to beans.

Prices of soybeans have varied quite a lot over the past 10 years. Buying prices (carlots f.o.b.) Chatham, averaged $1.97 a bushel in October-November-December of 1960-61; in the same 3 months in 1964-65 the average was $3.12; in 1970-71 the average was $2.90 and this fall, prices have probably been running a few cents higher generally and have been well over $3.00 recently.

The oilseed market in the world is something like the hog market in Canada. You tend at one stage to get over-production, prices go down, then production tends to dry up and prices rise again. In the case of oilseeds these surges and relapes are in relation to a rate of world consumption that has been rising at the rate of 2½% or more (850,000 tons in terms of oil) per year.

We appear to be at a rather critical place in the cycle now. High world prices for oils and meals in the past 2 years have induced an increase in oilseed production in the world which has sharply exceeded the increase in consumption for the first time in several years. For 1971-72 the need for rebuilding stocks in a general way is maintaining a good balance between supply and demand. The more

premium type of oilseeds including soybeans, sunflower and peanuts still remain at relatively high prices - well above those of 3 or 4 years ago although prices, except for soybeans, have tended to fall back from the last year's price levels. The principal loser in price from last year's price level is rapeseed, whose prices have fallen more than I expected. Rapeseed has been harassed by uncertainties surrounding the new type of oil free of erucic acid, particularly its market-ability in export markets and the apparent lower yield. In addition, rapeseed is taxed on entry into West Germany and the Netherlands by a so-called border tax which was applied a few months ago to keep a balance among prices paid to farmers in different EEC countries where currency values have been changing, but which was also applied against any other country including Canada. No such tax applies to soybeans; there is currently little or no soybean production in Europe. A somewhat similar situation exists in Japan where soybeans enjoy a lower tariff compared to rapeseed, although I understand this tariff is likely to be removed in April, and the two oilseeds put on an equal basis. The EEC tax has probably been partly responsible for the widening gap in prices between rapeseed and soybeans this past fall. However, the demand for good quality protein meal has been increasing in Europe and soybeans provide very high quality protein supplement. Over half the value of soybeans is in the meal; with rapeseed, which has more than double the oil content of soybeans, the oil value constitutes about 3/4 of total value.

With other oilseeds, there are many uncertainties which in the next few months could create fluctuating and unstable prices. However, with soybeans there is no reason, at present, to expect price declines in the next few months. U.S. future prices show rises of a few cents in each of the next few months. U.S. total supplies for 1971-72 are 5 percent lower than last year even if they did grow a record 1.2 billion bushels so that in effect there is a soybean shortage this year.

Prices seem to be predictable and to be strong for the next few months. The next minor impact on prices could come on January 27 when the U.S. puts out its first crop intentions statement. The U.S. government is hoping that the U.S. will

raise their acreage by 5 million to 48 million acres this year. A smaller increase in acreage would likely not have an impact on price, but if the full 5 million acres seems likely to be forthcoming, prices could soften somewhat even within the current crop year. The size of next year's U.S. soybean crop relative to needs will be the most important factor in price formulation next year for the United States and ourselves alike. Prices have been high and the size of the extra acreage is difficult to assess and might be lower than hoped for. Another set of considerations concerns the probability of increased world production of oils and fats in 1972. This is probably more significant in the case of rapeseed, as the high protein meal demand should help to holster the continuation of good levels of export sales of soybeans at good prices even if, for example, sunflower seed production increased substantially.

Over the next few years Britain's entry into the Common market will involve among other things loss of Canadian preference in oil and meal. Exports of meal and oil have been very significant to our crushers; loss of markets to United States processors would lead to reduced U.S. bean imports into Canada. It appears likely that we would not continue to be net importers, but our producers should not be seriously if at all affected. Even if our crushers had been unable to sell any meal or oil abroad in 1970-71 we would still have required imports of 8 to 10 million bushels, indicating we could absorb production from an almost doubled acreage of soybeans in Canada over the next few years unless rapeseed competition becomes a more significant factor.

White Beans

One of the aspects of white bean production which has always interested me is the rather exclusive area in Ontario and Michigan which seems suited to its production. On the farm where I grew up in Lanark county we once in a while grew a few beans but not in any quantity and probably with rather meagre returns. I see they have been growing several types of beans in western Canada including some white beans and in addition some adzuki and mung beans but not in really competitive

quantities to date at least.

Production of dry beans in Canada for 1971 is estimated in the Ontario Crop Conditions report of November 15 to have been 147 million pounds, 30 percent more than 1970 production and 20 percent above the 5 year 1964-68 average. I understand your Board feels this may even be a little low. Acreage in Ontario constituted 99 percent of the total for Canada in 1971 at 94,000 acres compared with 81,000 in 1970. Yields in white beans have been improving with this year's yield at over 15 cwt. per acre, more than 30 percent better than yields 10 years ago.

The total white bean payment for the 1970 crop was $9.25 per cwt. which was a record and the total yellow eye payment amounted to $17.22 per cwt.

Average prices on sales to December 13, 1971 were $11.98 for white and $18.63 for yellow eye beans. Prices for white beans in early December were over $14.00 per cwt. indicating the possibility that white bean payments for the current season will be higher than last year and probably well over $10.00 per cwt. even though we are now past the season's peak in prices. Yellow-eyed beans on the other hand, after expenses, are likely to be below last year's figure. Yellow-eyed beans constitute only between 1 and 2 percent of the total.

Part of the reason for successes of the last two years must relate to the reduction in competition from Michigan beans. In 1969 Michigan had 671,000 acres, about 7 times Ontario's acreage this year, and grew more than 8 million cwt. In 1970 their acreage was down 11 percent and their yields 13 percent. In 1971 their yields were down again slightly but acreage was up a little to 609 thousand acres. Production in 1971 at 6.3 million cwt. was more than 20 percent below 1969 and 1970 production was also about this level. This is a little more than 4 times total Canadian production.

Out of total sales of 112 million pounds of white beans handled by your Board up to December 13, 1971, 41 million went for domestic uses and 71 million went on export. About 97 percent of Canadian exports went to Britain with small quantities also to Iraq and very limited amounts to Norway, Turkey and Jamaica. In some years

when prices were lower the World Food Program has taken small amounts for Food Aid.

The tariff of 1½ cents per pound on U.S. beans tends to mean that Ontario producers should be able to hold the Canadian market for Canadian beans, if attention is paid to relative prices. Freight rates to Canadian West Coast markets were adjusted a few years ago to permit Canadian beans to compete better in that market. From a transportation point of view Canadian beans should have an edge into main Canadian markets and even on export.

While the future of the Canadian market for Canadian beans seems reasonably secure, there are problems looming in connection with the export market. Prior to the recent G.A.T.T. Kennedy round of tariff negotiations, Canadian beans entered Britain free but there was an 8 percent tariff on U.S. beans which was cut to 4 percent under the G.A.T.T. revisions. In 1969 Britain obtained 49 percent of its beans (price basis) from the U.S. and 43 percent from Canada. However, in the current crop year our share of the U.K. market will likely exceed that of the U.S.

With Britain's entry into the Common Market we will lose the 4 percent margin of preference and all suppliers will be subject to the 4½ percent tariff of the E.E.C. on white beans. Thus we will be forced to drop our prices to the U.S. level. We would assume that Canadian bean growers would be unwilling to lose the British market and will accept lower returns on export sales in order to meet U.S. prices. Losses in volume of exports to the U.K. should be minimal but the price loss looks to be in the order of at least half a cent a pound. It should be stressed also that the effect of the changes will be spread out over the next few years and not fully felt until 1975, in keeping with anticipated terms of Britain's entry into the E.E.C.

The price outlook for next year's crop appears likely to depend pretty heavily on the total supplies likely to be available in Ontario and Michigan. It has been suggested that Canadian acreage might increase by 20 to 25 percent in 1972 with the high prices prevailing, although this would by no means assure a 20 percent increase on production. It is difficult to make any suggestions as to what

may happen in Michigan. They have been having lower yields the last two years and if they got higher yields on the same acreage it would mean higher production. At the same time with prevalent high prices they may be tempted to increase their acreage as well. Lower U.S. prices would result in lower domestic as well as export prices. We will get a better indication of what to expect when crop intentions are made known not only in Ontario but perhaps more particularly in the U.S. Following that, the question will be whether Michigan can break out of the poor yield pattern which has been prevalent there for two years.

On the whole for the next crop year there is no reason at present for pessimism, but a continuation of the expected rate of expansion would doubtless quickly result in over production and lower prices might be almost inevitable. The Canadian market can not be expected to take much more than 50 million lbs. You would have to raise the December 13 export figure of 71 million to 90 million to clear the market this year. All extra production has to go on export with all the uncertainties which this involves.

Winter Wheat

Total production of winter wheat in Ontario in 1971 was given by Statistics Canada at 14 million bushels compared with 15.6 million in 1970. The most winter wheat grown in recent years was 26 million bushels in 1953, but I notice from our records that there was a production of nearly 28 million on 972 thousand acres back in 1915. Acreage in the fall of 1971 is estimated in the November 15 issue of Crop Conditions in Ontario at 405,000 up 8 percent from the 376,000 acres in 1970. If we reach 400 thousand acres and get yields equal to the 43.9 bushels of 1970 rather than the lower yields of 1971 we would have a production of 17 million bushels, the highest since 1964. A more likely yield of 40 bushels per acre on 400,000 acres would give 16 million bushels of production.

Average farm price has fluctuated very much over a period of years. Back in 1932, the farmers got the very low return of 49 cents per bushel. Further back in the post World War I year of 1919, they got $2.45. In recent years for three years

1966-67 through 1968-69 the average price to farmers was steady at $1.81 falling in 1969-70 to $1.73 and in 1970-71 estimated farm value as indicated in the Ontario Department of Agriculture release of November 15 was $1.64 per bushel.

Prices quoted in the daily paper, for No. 2 wheat, track shipping point, were $2.00 for January 6, 1970 and January 6, 1971. At June 5, 1970 prices were $1.92 and at the same date in 1971 were also $1.92. At December 23 in 1970 prices were $1.98 while in 1971 had climbed again to $2.00.

On the disposal side the quantity of Ontario wheat going for domestic milling purposes has been running between 8 and 9 million bushels. Exports of wheat and flour have been very irregular, climbing over 5 million bushels in 1964-65 and again in 1968-69 but were less than 600 thousand bushels in 1965-66 and 1967-68. In 1970-71 the Board took over 5 million bushels and exported 4.6 million according to a preliminary Statistics Canada figure. I understand the Board has taken possession of 4 million bushels this year, and carried over 250 thousand bushels from last year. Among the earlier sales you made was the sale of 1.5 million bushels to Syria. Sales to such countries as Iraq and Britain should leave very little carry-over into next season.

As far as the domestic scene is concerned prices will depend on the outcome of negotiations with the millers next May. It does not appear that there are any particular changes in demand relative to last year and that needs should continue at from 8 to 9 million bushels.

The prospects for the export market for next year's crop will depend on the world market generally and on the amounts we wish to dispose of. While carry-over may be fairly light, at least compared with some earlier years, the expected increased production itself next year could leave us with the need to sell on export or otherwise dispose of, perhaps 2 million bushels more than this year.

World prices for all types of wheat have been soft since late summer when it became apparent that many countries which had poor wheat crops last year would

have sharply increased production in 1971. Both importing and exporting countries had higher production, although admittedly stocks were down to start the year. Among the seven main traditional exporting countries there was a production increase of 650 million bushels, more than offsetting a reduction of 540 million bushels in beginning carry-over stocks. Total supplies in these countries are up to 6.1 billion bushels. This is still well below the 6.6 billion available in 1969, but we seem to be on the verge of a stock rebuilding instead of going in the other direction as hoped for and worked for in the last few years. The U.S. has a bigger winter wheat crop to come off next July, estimated recently at nearly 1.3 billion bushels, up by 130 million over last year's winter wheat crop.

Many countries are capable of providing world needs for the same type of wheat we grow in Ontario. It is hard to see any cause for improvement in the world wheat market over the next year or two and it seems likely we will have a continuation of the soft prices we are now experiencing. Some markets such as Syria may still be open to us where credit sales are involved, and your board I believe is hopeful for sales opportunities in such areas as North Africa. In a general way I think it can be said that for this coming year you may have a little more wheat available than you can dispose of to advantage and you could have some increase in carry-over, or increased sales into the feed market would be necessary. And in the future we must remember that when Britain joins the E.E.C. they will likely turn to France for soft wheat imports while at the same time the British farmers will have considerable incentive to step up their own production with prices to farmers likely to increase by 35%.

SELECTING SOYBEAN VARIETIES FOR 1972

R.I. Buzzell, Canada Department of Agriculture
Research Station, Harrow

The varieties recommended for 1972 (with their heat-unit rating in parentheses) are as follows: Altona (2500), Vansoy (2600), Hardome (2700), Chippewa 64 (2800), Harosoy 63 (3100), Harwood (3150), Beeson (3200), and Amsoy 71 (3200). Ample seed is available for all varieties except Amsoy 71; seed of it will not be generally available until 1973.

All varieties except Vansoy and Hardome are resistant to Phytophthora rot.

Recommendations and agronomic results are given in O.D.A.F. Publication 296. Long-term variety comparisons for the 3000-3500 heat unit area are given below.

Table 1. Four-year average of 15 trials located at Ridgetown, Oil City, Woodslee and Harrow

Variety	Yield Bushels/acre 14% Moisture	Days from planting to Maturity	Plant height inches	Lodging 1 = None 5 = All
Hardome	41	110	37	2.8
Chippewa 64	41	115	35	1.8
Harosoy 63	45	123	42	2.8
Harwood	46	124	38	2.2
Beeson	49	127	39	2.4

Harosoy 63 is a good variety in the 3100 heat unit area. It is also very good in the 3400 heat unit area, especially when preceding winter wheat. However, on fields where lodging is a problem, Harwood is a better variety than Harosoy 63 because it is more resistant to lodging and can stand higher soil fertility. Unless lodging is a serious problem in all of your fields, you could hedge and plant some of both varieties.

Beeson and Amsoy 71 average 4 to 5 days later than Harosoy 63 and in some cases they may be as much as 10 days later. On the average, Beeson and Amsoy 71 yield the same, which is about 4 bushels higher than Harosoy 63. In a few tests Beeson has yielded less than Harosoy 63, but the odds favour higher yield for Beeson in most of your fields in most years.

Weather conditions differ from one year to another; thus one variety may yield best one year and another variety may yield best and next year. In order to obtain the highest average yield per acre each year, you can hedge by growing 2 or more varieties each year. However, you probably would want to grow a larger acreage of one of the varieties than of the others.

Selecting a soybean variety or varieties to grow is a management decision. Recommendations and test results serve as guidelines. All varieties may not respond the same to your other management practices.

SPECIFIC WEED PROBLEMS IN SOYBEANS

J. E. Shaw, P.Ag.
Horticulture & Biology Division
R.C.A.T., Ridgetown, Ontario

At present there are several herbicides which the soybean grower may use as tools to help combat his weed problems (Table 1.). These chemicals are being used alone and in combination to control a wide spectrum of weeds. They may be used to supplement cultural practices, such as cultivation, or in some cases replace them. Results presented in Table 1. are based on weed weights usually recorded 4 to 6 weeks after herbicide application. No mechanical weed control was employed on the test plots.

Table 1. Herbicide performance in soybeans (Harosoy 63) at R.C.A.T. (1962-1971).

Herbicide	lb ai/A	Applied	Average % weed control BLW	G	Plots	Yrs	Yield above unweeded bu/A @ 15% moisture[a] Avg	Plots	Yrs
Treflan	3/4-1	ppi	69	85	33	7	7.9	29	6
Vernam	2-3	ppi	63	70	22	5	7.6	25	5
Amiben	2-4	pre	84	84	63	10	9.3	45	6
Linuron	1 1/2-2	pre	69	41	79	10	8.2	45	6
Patoran	1 1/2-2	pre	63	21	30	6	6.7	30	6
Lasso	1 1/2-2	pre	50	95	24	5	11.8	20	5
Lasso + Patoran b/	1 1/2-2 + 3/4-1	pre	87	88	13	3	11.2	13	3
Lasso + Linuron b/	1 1/2-2 + 3/4-1	pre	88	96	19	3	12.6	15	3
Treflan; Patoran c/	3/4-1; 3/4-1	ppi; pre	90	94	16	5	14.2	16	5
Treflan; Linuron c/	3/4-1; 3/4-1	ppi; pre	89	95	18	5	11.2	18	5
Lasso; Tenoran + adj.T. c/	2; 1 1/2-2 + .5%	pre; post	94	97	10	3	9.4	10	3
Treflan; Tenoran + adj.T. c/	3/4-1; 1 1/2-2 + .5%	ppi; post	98	92	10	3	8.8	10	3
Tenoran + adj.T.	2 + .5%	post	80	25	16	5	8.3	21	5
Check weeded							15.1	100	6

a/ The average yield for unweeded check plots is 22.7 bu/A (100 plots for 6 years); b/ Tank mix; c/ Split application.

During the last decade, considerable advances have been made in the weed control area of soybean production, but there are still many problems confronting us. Perennials and hard to control annual broadleaf weeds are the most troublesome. Yellow nutsedge, quackgrass, milkweed, Canada thistle, sow thistle and field bindweed are the major perennial weeds encountered in soybeans. Velvetleaf, cocklebur and, in some areas, Jimsonweed are the annuals that most frequently escape our weed control programs.

Perennials reproduce by both seeds and underground vegetative parts such as rhizomes or tubers. The plants that develop from seeds are controlled by soybean herbicides but the plants that develop from rhizomes or tubers are generally not controlled. The vegetative parts of perennials pose the greatest problem in soybeans.

Most perennials are more easily controlled in other crops in the rotation, for example corn or cereal crops. The hormone type sprays, such as 2,4-D and Kilmor are quite effective against Canada thistle, sow thistle and field bindweed when sprayed at the bud stage of growth.

Quackgrass is most effectively controlled with a split application of atrazine in the corn crop. No herbicide can be used directly in the soybean crop for quackgrass control. Amitrole-T can be used at 2 to 3 lb ai/A on actively growing quackgrass prior to seeding the crop. The quackgrass turns white after 7 to 10 days. The soil may be worked 10 to 14 days after treatment and the crop planted. Row cultivation may be necessary for satisfactory control.

Yellow nutsedge is a very persistent perennial that produces both seeds and tubers. Once the tuber population is built up in an area, eradication of this weed is impossible with the herbicides we now have available. Vernam used at 2 to 3 lb ai/A will provide 6 to 8 weeks of control but will not eradicate this pest.

Milkweed is difficult to control under any situation, but the best method is to attack it when the area is not in crop. Another approach may be spot treatment of patches of this weed, realizing that the crop in the treated area may also be destroyed. Amitrole-T or Kilmor applied to milkweed just before flowering, and directed up to the underside of the leaves will give some control, but repeated applications are necessary.

Velvetleaf is one of the most persistent of the annual broadleaf weeds found in soybeans in this area. It is controlled to a limited extent by most of our recommended herbicides, but certainly not controlled at a satisfactory level. For one reason or another velvetleaf is one of the most frequent escapes from any weed control program that we can suggest. Table 2. shows some results obtained on direct seeded velvetleaf. An equal number of uniform seeds were sown at a depth of 1½ inches. Even under ideal conditions for the herbicides to work, satisfactory control has not been achieved. In the field, conditions are never as ideal as they were for obtaining the data presented in the table. Field results are generally more variable and less promising. We must still rely very heavily on cultivation, particularly the rotary hoe to reduce the velvetleaf population in soybeans. Two or three rotary hoeings, early before weed seedlings emerge, certainly helps to control this weed without detrimental effects to herbicide performance.

Table 2. Control of direct seeded velvetleaf and Jimsonweed with soybean herbicides at R.C.A.T.

Herbicide	lb ai/A	Applied	Avg. % control: Velvetleaf (1968, 1970 & 1971)	Avg. % control: Jimsonweed (1970 & 1971)
Treflan	3/4-1	ppi	0	0
Vernam	3	ppi	48	0
Lasso	2	pre	30	58
Patoran	1 1/2-2	pre	58	66
Linuron	1 1/2-2	pre	67	72
Amiben	3	pre	86	47
Tenoran + adj.T.	2 + .5%	post	39	85

Cocklebur and Jimsonweed may also be troublesome in some areas. These are also tolerant to some of the soybean herbicides. Linuron and Patoran have given fair to good control of Jimsonweed (Table 2.), but are weak on cocklebur. Tenoran plus Adjuvant-T controls both cocklebur and Jimsonweed if they are treated when the seedlings are small (less than 2 inches high when sprayed).

In conclusion, even though we have available some effective herbicides and herbicide programs, some weeds are not easily controlled. Choosing the correct weed control program requires considerable planning. Long term control programs are necessary for the persistent weed species. Knowledge of what weeds you have to deal with on your farm, and knowing their strengths and weaknesses, as well as knowing what "weapons" to use at what time, are imperative if you are to win the battle against weeds.

INOCULATION - IS IT NECESSARY?

D.A. Littlejohns, Farm Crops Division
Ridgetown College of Agricultural Technology

Soybean inoculant contains nitrogen-fixing bacteria (rhizobia) which infect the soybean root system, stimulating the plant tissue to produce nodules. The bacteria, once established on the soybean root, take nitrogen from the air and fix it in forms easily used by the soybean plant. They do not produce nitrogen for any other crop. Recent reports show that up to 174 lbs. of nitrogen per acre can be fixed by these bacteria.

Nitrogen fixation begins several weeks after seed germination and consequently a small amount of nitrogen at planting time will show an early growth response. This, however, seldom results in any increase in yield. When large amounts of nitrogen are applied, the bacteria become lazy and produce fewer nodules, resulting in less nitrogen being fixed.

The bacteria that nodulate soybeans are not native to our soils and when soybeans are grown in a field for the first time, the use of soybean inoculant is a must. In order to ensure that a satisfactory bacteria population will be present, apply the inoculant to the seed at three times the recommended rate. Often the sprinkling of some water on the seed prior to applying the inoculant will help in sticking the inoculant to the seed. If soybeans have been grown only once in a field it is imperative that inoculant be heavily applied the second year in order to build up the bacteria to a satisfactory level.

Once the bacteria are introduced into the soil, they remain viable for a long time and are as capable of invading the soybean roots and fixing nitrogen as the bacteria that are applied in the inoculant. Consequently the advantages of applying inoculant to the seed in soils with a history of good nodulation are debatable. Research results from Iowa, Indiana and

Minnesota have shown that in soils where well nodulated soybeans were grown within the past 3-5 years, less than 5% of the nodules formed resulted from applying the inoculant with the seed. Also no differences were found in yield between inoculated and non-inoculated areas of these fields. At Ridgetown, we have been unable to get any response to applying inoculant in fields that have had a history of good nodulation but have been able to obtain responses on fields where soybeans were grown for the first time.

If there is some doubt about the amount of nitrogen-fixing bacteria for soybeans in the soil, it is cheap insurance to apply inoculant to ensure satisfactory nitrogen fixation.

Seed Treatments and Inoculants

It often becomes necessary to use a seed treatment consisting of a fungicide-insecticide combination for control of wireworms, seed maggots and seed-decay organisms. Seed treatments, particularly the insecticides are toxic to the bacteria. When soybeans are grown for the first time, seed treatments should be avoided to ensure proper nodulation. When seed treatments must be used, the best solution is to use pretreated seed and inoculate heavily just prior to planting. Beans should be planted into moist soil to ensure survival of the bacteria and to enhance germination of the seed.

WHAT ARE QUALITY SOYBEANS?

Howard Pitz
United Co-operatives of Ontario

Without being technical, my definition of quality soybeans are beans of the grade and moisture best suited for the requirements of soybean processors. Processors want dry, clean beans grading No. 2 or better, delivered as they are required throughout the year. To a soybean processor, ultimate yield is the yardstick that measures his purchasing policy. An ideal yield from a bushel of soybeans is 48 pounds of meal, 11 pounds of oil and 1 pound of waste product. Anything down-grading soys will reduce the processor yield and increase costs resulting in lower returns to growers.

Grades for all grains are established by the Canadian Grain Council under authority of the Canada Grain Act. An Eastern Grain Standards Committee, made up of fifteen members of whom four are producers, meet annually to review the standards and recommend changes. The standards for the various grades specify minimum test weights and maximum limits of damage and foreign material. Moisture discounts and premiums are negotiated annually between the Ontario Soybean Growers' Marketing Board representing producers, the country dealers and the processors. Beans are purchased according to grade and moisture content, and beans grading below No. 2 grade and above 14% moisture are discounted in proportion to the degree they fall below standards. There are premiums for beans containing less than 14% moisture.

A break-down of the first 490 rail cars of soys inspected during the past harvest revealed that 41% of the cars contained moisture over 14% and that 25% contained various percentages of dockage-pods, straw etc. However, only 13 cars graded below No. 2.

In my opinion the most serious area of concern is high moisture soybeans both in storage and for shipment to processors at harvest time. In recent years corn and soybeans have been harvested simultaneously. Dryer systems at local

elevators are running at full capacity on wet corn which must be dried promptly to avoid spoiling and because of the higher moisture content generates a greater dryer revenue for the dealer. As a result, when growers deliver moisture beans, they are shipped immediately by the dealer to the processor. Soon the whole marketing chain becomes jammed with wet beans and as they must eventually be dried at the processing plant to an average moisture of 10-12% we find, as happened again this year, the processor being eventually forced to refuse delivery or adjust prices downwards in an effort to hold back deliveries.

If we are to maintain and further develop a healthy, growing soybean industry, it is imperative that we supply processors with the quality beans they require for delivery when they want them. I should like to make a few suggestions as to how producers can do a better job in achieving this objective. Considerable time, money and effort is spent in producing a soybean crop. To ensure a good market and to maximize returns, as much care and thought should be exercised in harvesting, storage and marketing practices. More effort should be made to "play" the weather at harvest time to avoid high moisture beans on the one hand or excessive splitting of dry beans on the other. Before combining, more producers should bring samples to their local elevators for testing. More care should be taken to make sure that combines are properly adjusted to reduce splitting and dockage from pods, straw etc. and also to avoid adhered soil. More beans should be farm dried and stored for sale later in the season when prices are usually better, but keep checking those storage bins for possible deteriation. It should also be remembered that using aeration when humidity is high, can increase moisture rather than reduce it. When artificially drying beans, burner temperature should be kept from 95-110 degrees to minimize splitting and peeling.

If these few suggestions for improving the quality of soybeans help to promote others, resulting in better net returns and a more viable industry, they will have served their purpose.

ECONOMICS OF FERTILIZATION OF WINTER WHEAT

C.K. Stevenson, P.Ag., Soils Division
Ridgetown College of Agricultural Technology
Ridgetown, Ontario

Winter wheat is an important crop grown in Southwestern Ontario, especially in the five extreme Southwestern counties. It ranks third in Essex, Kent and Middlesex counties and fourth in Lambton and Elgin in most acres devoted to a particular crop. Despite this fact it receives less attention than some other crops, such as corn, regarding its fertilization. Crop cost studies conducted in Southwestern Ontario with both corn and winter wheat indicate that fertilizer is the second highest cost item next to land in growing these crops. According to these studies the average cost per acre for fertilizer is $9.50 which represents 11.3 percent of the production costs of winter wheat. Therefore, it is important to look over your fertilizer program for winter wheat to see if you are getting the full value for every dollar spent on fertilizer.

Let's look over some of the things that should be considered in deciding on a fertilizer program for winter wheat.

Fertilizer Recommendations

The main nutrients that have to be considered are nitrogen, phosphorus and potassium. Soil reaction or pH is important and should be above pH 6.0 for best production. The best way to determine the fertility and pH levels of your fields is by having the soil tested. On the basis of soil tests, recommendations are made on the amount of fertilizer and limestone to apply to obtain highest economic yields. When a soil test is not available the general fertilizer recommendations for winter wheat found in O.D.A.F. Publication 296 "Field Crop Recommendations" can be followed.

Winter wheat will give economic yield responses up to 40 to 60 pounds of total nitrogen per acre where it does not follow a legume sod or is heavily manured. Where wheat follows a legume sod or is heavily manured no fertilizer nitrogen should be required. Nitrogen can cause lodging of winter wheat if applied at too high a rate or if consideration is not given to the nitrogen likely to become available from other sources -- legume sod and manure.

Phosphorus is a very critical nutrient in growing winter wheat and there should always be some phosphorus fertilizer (30 to 40 pounds P_2O_5/acre) applied for winter wheat, even at very high soil test levels that show very little or no requirement.

Method and Time of Fertilizer Application

The method of placement is especially critical with phosphorus. Research results show greater efficiency in phosphorus use by wheat when the phosphorus is drilled with the seed compared to broadcast applications, especially at low soil test levels. On high testing phosphorus soils there is likely to be very little difference in yield due to the method of phosphorus placement. Where fertilizer is applied with the seed at planting not over 15 pounds of nitrogen or a total of 30 pounds of nitrogen + potash should be placed with the seed of wheat. Rates higher than this can cause fertilizer burn damage to young seedlings especially under dry conditions.

Many farmers today do not have a fertilizer attachment on their drill and therefore must broadcast their fertilizer for wheat ahead of planting. One of the problems that can be encountered when the large four ton spreaders are used to apply fertilizer for wheat is uneven application. This should be avoided as it can result in wasted fertilizer dollars. Uneven fertilizer application can be caused by improper adjustment of the machine as well as driving too wide for the effective width of spread of the machine.

The additional nitrogen requirements of wheat should be applied in the early spring (late March to early April) just before growth begins. Fall application is not recommended except on soils where it is impossible to get on the soil in the early spring. Research results show that it takes 80 pounds of nitrogen fall applied to produce the same yield as 40 pounds spring applied. Late spring applications are not nearly as effective as early spring applications.

Fertilizer Sources

Ammonium nitrate, urea, and ammonium nitrate-urea solutions (28% N) should be equally effective for topdressing winter wheat. Neither urea nor diammonium phosphate (18-46-0) should be applied with the seed of fall wheat as they are extremely toxic to young seedlings. These two materials can be used when broadcast at or near planting time at rates normally used.

POTENTIAL SEED TREATMENTS

Dr. L.V. Edgington
Department of Environmental Biology
University of Guelph

The Federal Government has extended the use of organic mercury fungicides for treatment of cereal seed for 1972. However, stocks are insufficient to treat all seed. What should growers do when their seed dealers tell them their supply of organic mercury is exhausted?

Three alternatives remain for the grower. One is to omit treatment of seed; a second is to treat the seed in the seed drill with a dust formulation of several non-mercurial fungicides; and a third is to request treatment by the seed dealer with a liquid suspension of certain non-mercurials.

The first alternative is a gamble on favourable soil moisture and temperatures in the spring for barley and oats. All barley seed carries a reasonable percentage of fungi capable of causing seedling blight. If you can be sure of <u>ideal growth</u> conditions, these fungi are not too serious.

The second alternative is not a gamble. In 1971, we tried using drill-box formulations in a standard seed drill with barley. While definitely less seedling blight developed the control was only mediocre. The same chemicals, applied as a liquid suspension to seed, give much more consistent control.

Therefore, our experience leads us to suggest that growers press for liquid suspension treatments with non-mercurials. At present, there are three registered for use on seed. All can be

used in modified Panogen-type seed treaters. Vitaflo is a systemic fungicide giving comparable control of seedling blight in the field to Panogen. Polyram liquid was recently registered for oats, wheat and barley. We have not yet evaluated this for controlling seedling blight of barley. Agrox N-M is a drill-box formulation which can be used as a liquid. Greenhouse tests recently look very favourable with this fungicide formulated as a liquid.

WHAT IS WHEAT QUALITY?

N.C. Stoskopf, P.Ag.
Crop Science Department, University of Guelph

Quality in Ontario wheat is described in relative terms - quality equal to or better than a standard such as Genesee. The original standard was Dawson's Golden Chaff selected in 1881 and since then all varieties reflect this level of quality. Few lines failing to meet this standard have been licensed. One is tempted to conclude that no progress in understanding quality has been made in ninety years. Such inflexible and antiquated quality standards impose too many restrictions on growers, on breeders, on the release of lines, and on introductions and may jeopardize wheat production in Ontario. Consider the following:

(1) To meet rigid quality standards, only soft white wheats with a narrow gene base can be safely used in crosses. The introduction of foreign genes to broaden the gene base to achieve yield increases or to obtain hardiness, disease resistance, seedling vigor etc. generally introduces alien quality factors. Yet without an increase in yield, wheat cannot remain competitive with other cash crops. High prices must be maintained to attract growers to fill domestic needs thereby pricing surpluses out of the international market. High yielding introductions such as Blueboy and its derivatives, often with only slightly alien quality, cannot be licensed and our growers are cheated out of higher per acre returns, become disgruntled and are tempted to go beyond the law. Yield increases using soft white parents only are possible but may be slow and small in magnitude. Private plant breeders will not be interested in breeding wheat with such rigid restrictions. Introduction of foreign genotypes may not always result in yield breakthroughs, but they may improve the chances. Breeders are aiming at lines capable of yielding 90 to 100 bus./acre in contrast to the present 60 to 70 bus./acre which will not likely come in one giant step but progressively over time. Yields of this order may be possible only by using

a wide gene base.

Opinions have been expressed that change with the introduction of new varieties is not desirable, that existing varieties can fill our needs, and that we overproduce wheat already. Improved varieties are needed just to maintain acreage and production, not to mention increased returns to the farmer and lower production costs per unit. If Dawson's Golden Chaff were the only variety available, there would be few producers today. Any healthy agricultural program will produce a commodity to the point of surplus. New varieties are the lifeblood for producers, seed growers, seed houses and industrial concerns alike.

(2) Quality standards have not changed, yet quality modifications have been brought about by management and production practices. Corn may receive 120 lbs. of nitrogen per acre per year. Soybeans fix atmospheric nitrogen. More nitrogen means more protein and stronger gluten. Wheat following corn and soybeans may be influenced by residue nitrogen levels. Plant breeders are searching for types that will respond to nitrogen in the form of grain yield which will encourage higher nitrogen applications. In any year weather can modify nitrogen uptake and protein levels. Is a fixed 8.5% maximum protein level for flour realistic?

Demands for higher yields, introduction of alien genes, introduction of foreign varieties (Blueboy derivatives) will mean that selections may deviate from the standard and farm pressure will be strong to have these types licensed. <u>Every effort will be made by plant breeders to meet quality standards</u> but high yielding "non-milling" wheats may be used as feed if a means of separating milling and non-milling wheats can be found. All my life I have been told that wheat is too expensive to be fed to livestock and poultry. This is not the case! Because wheat for feed has been a secondary use, the margin of price and hence choice generally has gone in favour of corn, barley, etc. A non-milling

wheat will not command the price of a milling wheat and can therefore be compared as a feed to other feeds. This could place wheat in a competitive price range making wheat a major secondary feed crop after corn. Because of quality deficiencies, non-milling wheats will be lower in price than milling wheats but will remain completely unacceptable for milling because of well demonstrated and rigid quality demands.

Although statistics show that a minimum of wheat is fed, I believe the time has come to release non-milling varieties. Statistics may not reflect wheat produced and fed on the same farm and at present there are no non-milling varieties of winter wheat to serve as a test case. Pitic and Opal are however examples of non-milling spring wheats that have been licensed.

Based on these observations the following are suggested:

(1) development of guidelines and tolerance levels for each quality criteria by a committee of millers, bakers, breeders, producers etc. for eligibility as a soft quality pastry wheat.

(2) development of a grading system whereby wheat not meeting quality standards outlined above can be relegated to the status of non-milling wheats. A marker or a quick and reliable means of identification may be needed for according to the licensing act, if a wheat can be identified from milling wheat it is eligible for licensing.

The problem between plant breeders and associated cereal technologists in maintaining an orderly marketing system is not new. Efforts must be made to make our system less restrictive so more people can benefit.

A PROCESSOR'S VIEWPOINT OF WHEAT QUALITY

F.J. Reid, General Manager
Reid Milling Ltd.

There are certain standards set by the Board of Grain Commissioners in order to have a sample of wheat graded either No. 1, No. 2, No. 3 etc. Of course most of us know these requirements and the fact that there is a little more involved than just weight per bushel.

We consider Protein very important to us as flour millers. The percentage of protein doesn't really matter as much as the fact that the protein is uniform and of high quality, in order to perform properly when the batter is baked. A lower level protein seems desirable for cake and biscuit flours - however, if a higher protein is required we can blend stronger wheats to meet the customers' specifications.

It is always desirable to receive farm wheat with the standard level of moisture. We do not attempt to store any wheat unless it is 14% moisture or less. I should also point out that if wheat has been dried with excessive heat, this can cause protein denaturing and of course then we do not have the quality of protein as mentioned above.

We also treat our stored wheat with Phostoxin for insect infestation control. We are under very strict infestation inspection from the Department of Health, Department of Agriculture, and our own customers laboratory departments.

We feel that farmers and elevators should endeavour to clean up their storage to stop spreading the infestation. This may not sound like "quality", but infected wheat is not fit for milling since weevil eggs will go through the finest of sifter silks and then hatch in the heat of a bakery - thus spreading the insects. In spite of the fact that we do entolate our wheat

before milling and also our flour before shipping, we still cannot always be certain of a hundred percent kill.

Cereal manufacturers require a sound wheat with very little sprout to enable them to get the desired size of biscuit - as there is very little other commodities that can be added to control product size. (Protax is one product used for this purpose.) They also desire a white wheat as this is important to produce as white a cereal or buscuit as possible after baking.

Of course we want clean wheat free from stinking smut or bunt, as well as free from foreign grains. And of course it must not be bin burned or musty.

We feel that the quality of Ontario Wheat is much superior to American Winter Wheat and we trust that the grain breeders and Department of Agriculture will protect this important selling point, expecially for the export market.

MARKETING QUALITY WHEAT

Otis McGregor
Ontario Wheat Producers Marketing Board

Having been requested to address my remarks to "What is Wheat Quality" as it relates to 'the implications involved with marketing different wheat types', the following comments provide a summary.

1. Ontario soft white winter wheats are preferred by the baking trade for pastry, biscuits, cookies, and to a lesser degree, cakes. By the cereal processors for breakfast foods, such as shredded wheat and shreddies.

2. Historically, the flour mills have required for processing during the past five years between 7.1 and 8.5 million bushels of wheat. It is estimated the cereal trade requires somewhere around 750,000 bushels.

3. Historically, Ontario has been predominately a soft white wheat area finding a preferred market domestically, (thanks to import controls under the Canadian Wheat Board) for the greater percentage of the wheat marketed. However, in the past couple of years Ontario wheat has experienced competition from the Soft White Spring Wheat of the irrigated area of Alberta and in the past year in the Montreal market with the development of white winter wheats produced in the St. Hyacinthe area.

4. Marketings of Ontario wheat beyond the domestic market is exported into the world markets competing against similar soft white wheats from Michigan, New York and the Pacific whites of the U.S.A., Mexico, France, Spain, Germany, but to name a few. In fact, practically all the wheat countries of the world produce a soft wheat.

5. Historically, Ontario has been a predominately soft white wheat area. Since the turn of the century through to the appearance of Cornell 595 in 1946, Dawson's Golden Chaff Wheat was synonomous with Ontario. Since 1950 there have been only three red wheats licenced, namely, Fairfield, Thorne and Kent. During the past year, the North Carolina variety, Blueboy, though not licenced, has been produced in Ontario with encouraging yields.

6. Soft Red Winter Wheat is predominate in Ohio like white wheat in Ontario. The planting in the fall saw a deeper penetration of red wheat from Ohio in Michigan even though at Toledo white wheat enjoyed a 10¢ premium over red wheats. At the year end, this premium was still 6¢ a bushel.

7. Ontario soft white wheat is a surplus commodity resulting from the yearly negotiated minimum prices to producers pricing wheat out of competition with other feed grains.

8. Would soft red wheats disturb the present system? What effects would non-millable wheats have in the market? To the farmer, his intention to seed other than a white wheat would depend upon his best return per acre. To the elevator operator, his interest would depend upon his turnover and whether his facilities were such to segregate the varieties. To the miller and cereal processor, acceptance will depend upon trade acceptance.

9. The pricing of red wheats is an important factor to the producer. If the wheat was used for feed purposes -- then the yield per acre must be greater if the wheat is marketed, as the price must compete with barley or corn. Should the wheat have milling qualities for blending purposes -- would such a program benefit only the miller granting him a greater profit?

10. Respecting the milling qualities of red wheats, I feel certain the miller could offset some of the deficiencies in quality. Although the red colour may cause the product to be darker in colour.

11. In the export market, we would face problems, especially in the U.K. market, if red wheats should be blended. Our market is for a quality white wheat for blending with English wheats especially in the biscuit trade. In Ireland where the yearly Irish Government Board Order states 75% of the wheat must be from local production - white wheat is required.

12. In the five counties of Southwestern Ontario, the segregation of wheats by the elevators could spell chaos. Traditionally at harvest we find no space at local elevators available for storage.

13. As the lifeline of the elevator is dependent upon turnover and blending to assure segregation in order to serve market requirements, farmer storage at home looms high on the horizon.

14. Reference has been made to non-millable wheats used primarily for the feed market possessing a high yield factor with a protein at least 1½ to 2% greater than the present protein of white wheats.

15. The implication involved in marketing different wheat types to the farmer is return per acre and the acceptability by the baking and cereal trade. For the feeder a high yield protein wheat of non-milling qualities and not subject to marketing fees may be the utopia.

that progress is being made in all these areas, and we are hopeful that some time in the not too distant future Eastern Ontario will provide quality corn that will be suitable for our use. Already of course most of it is going to the feed trade but some has gone to the distilling industry and this year a small amount was made available for export.

It is certainly the intention of The Canada Starch Company to buy as much corn as we possibly can in Canada, but we expect to buy this corn and land it at our plant at a price that is equal to or less than what it would cost to bring in U.S. corn. We believe that this price policy is a reasonable one because it is our view that the Canadian farmer producer is as ingenious, is as up to date and is as good a businessman as his American counterpart.

DEVELOPING WHITE BEAN VARIETIES FOR ONTARIO

J.W. Aylesworth, Plant Breeder
Research Station, Harrow

Three varieties of white beans are presently recommended for use in Ontario. These are Sanilac, Seaway and Seafarer. These bush-type varieties were developed at the Michigan State University and were tested a number of years in Ontario prior to their release. Besides having good yielding ability and processing quality they have a satisfactory level of resistance to diseases which may be a threat to the crop in Ontario. Sanilac is resistant to the three important strains of anthracnose and two of the prevalent strains of bean common mosaic. Seaway is resistant to two strains of anthracnose and three strains of bean common mosaic. Seafarer, the most recent release, is resistant to the three strains of anthracnose and the three strains of bean common mosaic. Because of the additional disease resistance in Seafarer, this variety will replace Seaway in 1973. Unfortunately, none of these varieties have resistance to bacterial blight and for this reason stringent control is necessary to maintain sources of seed which are blight free or nearly blight free.

A breeding program is under way at the Research Station, Harrow, to produce varieties with higher yield, good quality, improved plant type and improved disease resistance. Personnel of the Ridgetown College of Agricultural Technology are involved in this program and have tested many advanced breeding lines at Ridgetown and at Kippen in Huron County. The Canada Department of Agriculture has conducted similar tests at Harrow, Pain Court and Erieau. Included in the tests are new lines developed in Michigan as well as lines coming from the Harrow program. Before a line is considered for release as a variety, its performance has to exceed that of the presently recommended varieties, in yield, disease resistance or quality or all three of these characteristics.

In the breeding program at Harrow emphasis is being placed on producing varieties with a long hypocotyl and strong upright bush type so that it may be possible to combine the crop directly without pulling and windrowing. This would reduce the time involved in harvesting and also reduce the risk of weather damage at this time. A program is also under way to develop a variety with greater tolerance to bacterial blight. We are attempting to transfer blight resistance from the Great Northern types, Tara and GN1-27, to our present varieties. If successful this would reduce the severity of blight epidemics and crop damage during years when conditions were favourable for the development of the disease. In addition, root rot resistance from South American types is being used to breed for greater tolerance to the root rot diseases which are prevalent in Ontario soils. If possible we hope to pick up some measure of tolerance to bronzing along with other favourable characteristics as the breeding program progresses. Future work will include the improvement of quantity and quality of protein in white bean varieties. The work at Harrow is a long range program but we hope to have useful improvements in the next few years.

One promising C.D.A. line which has performed well over several years of testing, particularly in Huron County, is now being considered as a variety release. This line is a more upright bush type which holds its pods off the ground better than the present varieties. It has complete resistance to each of the three strains of anthracnose and bean common mosaic. Tests in 1971 indicate that it has a higher level of root rot resistance than the presently recommended varieties.

DISEASES IN WHITE BEANS

Jerry H. Haas
Canada Agriculture, Harrow

There are about 25 major diseases of beans in North America. White beans can have about 15 of these diseases. In Ontario, only 4 diseases are important; they are root rot, blight (common bacterial), bronzing and white mold. This relatively small number of diseases is a result of previous work by plant pathologists, plant breeders, and many other agricultural workers in Canada, the United States and other countries throughout the world. It is their work which has given us the know-how to produce average yields of 13 cwt. in the sixties and only 10 cwt. in the fifties. The control of diseases has played a part in our ability to increase yields.

In Ontario we are doing some work on each of the 4 major disease problems. Root rot resistance is being used in the breeding work. For blight control, the research workers, the seed growers and the seed inspectors are cooperating in a continuing effort to keep the bacteria out of Pedigreed Seed. Chemical control of bronzing and the cultural conditions which effect the amount of bronzing are being studied. Also, and most importantly, the Ontario Department of Energy and Resource Management is trying to limit the amount of ozone in the air. White mold, the 4th of the major problems, can be controlled by a chemical spray treatment which has been proven effective in Ontario. The chemical might be available for use this year but it may cost about $20 per acre to apply.

The main subject of my presentation today will be the cultural control of our major bean disease problems. Anyone who has called for advice on a disease affecting their white beans knows that we can't give a prescription for the cure of the present crop. (It is always next year's problems that we know how to control; that is what makes us experts.) Here is my prescription for the 1972 crop.

1. Crop sequence - Don't avoid beans just because you have had blight, bronzing, or white mold. If you have had little problem with root rot and are satisfied with the yield in your field, grow beans if you want to. The root rotting organisms survive in the soil for a long time; they can't be eliminated by rotation.

2. Soil structure and organic matter content - These are the most important soil factors influencing root rot. Any factor which stops or slows root growth through the soil will also increase the damage from root rot.

3. Fertilizer - Nitrogen applications have increased yields in areas where bronzing and root rot are a problem. Other nutrients should be supplied based upon a soil test. A well growing plant is least likely to have severe bronzing.

4. Seed quality - There is less blight in crops grown from Pedigreed seed; it's usually worth the extra cost. There should be less blight than usual in 1972 because of the dry weather in 1971. Much of the seed will be 'clean'.

5. Planting density - We used to recommend reducing the seeding rate if white mold was a problem. The results of the 1969-70 white bean survey showed that lower seeding rates did not control white mold. The average seeding rate used in Ontario (47 lbs./acre) is still higher than necessary.

6. Cultivation - If blight is present, the best way to spread it is with your cultivator. Make sure the plants are completely dry. Root rot will have a more severe effect on plants that have roots injured by a cultivator.

MANAGEMENT PRACTISES IN WHITE BEANS

A.D. McLaren, Head, Farm Crops Division
Ridgetown College of Agricultural Technology

It would appear obvious that white bean management in general should be aimed at providing the consumer with a product that will be accepted and used in generous amounts. This in turn means that the processor must be able to obtain raw material that can be easily converted to the type of product the consumer wants. From recent contacts with the processor representatives one can understand that beans with split or cracked seed-coats present a serious problem. When these beans are soaked, cooked and canned the seed-coats with even small cracks can break open. These present a most unappealing product when Mrs. Housewife opens a can and finds empty 'hulls' floating on top.

It is fair to say that the plant breeder has a relatively easy job to develop higher yielding varieties but when he must also have resistance to several diseases, short maturity, good flavour and strong seed-coats his job becomes more difficult.

One interesting point to note is that one of the lines that has looked well in field tests being slightly higher yielding and good disease resistance is of larger size than Sanilac or Seafarer. Samples of this new line along with Sanilac and Seafarer have been submitted to several processors for their evaluation. One processor downgraded the new line for being too large and less appealing in the can. Three others indicated the large size and good texture was quite desirable.

Management factors such as date of planting, row width, and seeding rate have been compared in years past and we all use about a 28" row and about 35-45 pounds seed per acre. Beans are planted in early June - for high yields and to

have harvest during a period that the odds favour good weather. Seeding rates are kept low so that seed is not wasted and to provide adequate space for each plant to develop fully. By following these practises we not only obtain optimum yields but also a quality product.

The final management decision that probably has the largest affect on the quality of the product is the harvest of the crop. Combine adjustment appears to be very critical as the beans dry out during the afternoon and cylinder speed should be reduced accordingly. It would be very unfortunate to have increased production and then be unable to market it because of damaged seeds.

WEED CONTROL IN WHITE BEANS

R.H. Brown and J.E. Shaw, Horticulture and Biology Division
Ridgetown College of Agricultural Technology
Ridgetown, Ontario

Monolinuron plus dinoseb (Afesin-Dinitro) is a new addition to the recommendations for weed control in white beans for 1972. Amiben, Patoran and Afesin-Dinitro are recommended pre-emergence treatments and may be applied as a band application or as an overall application at planting time or shortly after planting before the weeds and the crop emerge.

Patoran and Afesin-Dinitro control annual broadleaf weeds more efficiently than annual grasses. Amiben controls most annual broadleaf weeds

Table 1. Effect of herbicides in white beans on weed control and yield R.C.A.T. (1959-1971)

Herbicide	Rate lb ai/A	Applied	% Weed Control Broadleaf %	Range	Grass %	Range	Yield Increase cwt/A1/
Eptam	2-3	ppi	39	(0-90)	72	(13-100)	6.1
Treflan	3/4-1	ppi	59	(0-99)	74	(0-100)	6.7
Afesin-Dinitro	3-4 1/2	pre	72	(30-99)	44	(0-87)	4.9
Patoran	1 1/2-2	pre	72	(0-100)	43	(0-98)	5.5
Amiben	2-3	pre	62	(0-99)	60	(0-100)	6.4
Eptam;Patoran	2-3;3/4-1	ppi;pre	80	(62-100)	82	(66-100)	10.0
Treflan;Patoran	3/4-1;3/4-1	ppi;pre	87	(59-100)	92	(87-100)	8.0

1/ Yield increase in cwt/A above unweeded check; Unweeded check yielded 9.5 cwt/A.

and annual grasses about equally well. All pre-emergence herbicides require sufficient rainfall shortly after application to activate them. Harrowing, rotary hoeing, or shallow cultivation will assist these herbicides under droughty conditions.

Eptam and Treflan are more effective in the control of annual grasses than annual broadleaf weeds. Eptam is also useful for nutsedge control. Both should be incorporated immediately after application prior to planting.

Care should be taken to apply Eptam to a dry soil surface and to apply it 7 to 10 days prior to seeding if dry weather has preceded application.

Better and more consistent weed control is obtained when a program of Eptam or Treflan applied preplant and incorporated into the soil followed by Patoran as a pre-emergent spray is used. The strength of both herbicides in the program is obtained to kill a broad spectrum of annual grasses and broadleaf weeds. Another advantage of both of these programs is that one herbicide is worked into the soil and one is applied to the surface of the soil to provide more killing action in the total area from which weeds germinate.

Each herbicide is effective in the control of certain weed species.

Table 2. Control ratings of white bean herbicides on specific weeds. R.C.A.T. (1967-1971)

Weed Control Rating

E - excellent
G - good
F - fair
P - poor

	Chemical						
Weeds	Eptam ppi 2-3 lb ai/A	Treflan ppi 3/4-1 lb ai/A	Amiben pre 2-3 lb ai/A	Patoran pre 1 1/2-2 lb ai/A	Afesin-Dinitro pre 3-4 1/2 lb ai/A	Eptam ppi 2 lb ai/A + Patoran pre 3/4-1 lb ai/A	Treflan ppi 3/4-1 lb ai/A + Patoran pre 3/4-1 lb ai/A
Wild buckwheat	F	G	F	E	E	E	E
Smartweeds	F	F	G	E	E	E	E
Lamb's quarters	G	G	G	E	E	E	E
Mustards	P	P	F	E	E	E	E
Black nightshade	P	P	G	E	E	E	E
Pigweeds	F	G	E	E	G	E	E
Ragweed	F	P	G	E	E	E	E
Velvetleaf	P	P	G	F	F	F	F
Barnyard grass	E	E	G	F	F	E	E
Crabgrass	E	E	F	F	F	E	E
Foxtail	E	E	F	G	G	E	E
Old witchgrass	E	E	G	G	G	E	E
Nutsedge a/	E	P	P	P	P	E	P

a/ Nutsedge is a perennial.

There are different weed species in different areas of white bean production. There are also variations from one field to another in the weed species most prevalent. For this reason an attempt has been made to indicate to what degree the annual weeds can be controlled by the different recommended treatments provided the weather conditions are optimum for the herbicide to work. There are many conditions which may result in better or poorer control than indicated. Soil type, rate of chemical applied, soil moisture at time of application, inadequate or excess rainfall and thoroughness of incorporation of the preplant incorporated herbicides are factors which influence the success with chemical weed control.

Two weeds which have caused concern in recent years to white bean growers are black nightshade and velvetleaf. Black nightshade seeds discolour white beans at harvest and are poisonous. Velvetleaf is a large competitive weed which germinates over an extended period of the growing season and is quite difficult to control. Amiben has proved most effective in the control

Table 3. Control of velvetleaf and black nightshade with herbicides used on white beans. R.C.A.T.

Herbicide	lb ai/A	% Control Velvetleaf	lb ai/A	% Control Black nightshade
Eptam	3	10	3	0
Treflan	1	13	3/4	0
Amiben	3	72	3	66
Afesin-Dinitro	1-1 1/2+3-4	56	1-1 1/2+3-4	97
Patoran	2	41	2	93
Eptam;Patoran	3;1	57	2;3/4	85
Treflan;Patoran	1;1	28	3/4;3/4	75

of velvetleaf compared with the other treatments recommended for weed control in white beans. Late germinating velvetleaf plants frequently escape control. Afesin-Dinitro, Patoran and the programs containing Patoran are generally most effective for black nightshade control.

1971 WHITE BEAN FERTILITY RESEARCH - NITROGEN

Dr. C.S. Baldwin, Head, Soils Division
Ridgetown College of Agricultural Technology
Ridgetown, Ontario.

In 1971 research with nitrogen on white beans was conducted at five locations in Southern Ontario. The areas were selected such that two trials were located where no particular problems had been encountered with yield and three trials were located where yield problems had been encountered. The locations and particulars of each trial are as follows:

Location	Farm	Yield Problem	County	Township	Planting Date	Harvest Date
1	R. Simpson	Yes	Kent	Harwich	June 15	Sept. 7
2	H. Ashton	Yes	Elgin	Aldborough	June 14	Sept. 23
3	H. Datars	Yes	Huron	Hay	July 7	Oct. 13
4	J. Peck	No	Huron	Hay	July 7	Oct. 13
5	L. Verchuren	No	Oxford	Dereham	June 15	Oct. 14

Seafarer beans were grown at all locations. The trial at location #3 (H. Datars' farm) had to be discarded due to an uneven stand of beans. All nitrogen was applied as ammonium nitrate, broadcast and disked in just prior to planting. All plots received 0-25-25 at 800 lbs. per acre broadcast and disked in before seeding.

The yield data for each of the harvested locations are found in the following table:

Table 1 - Yield data for N on white beans - R.C.A.T. 1971

Farm	N(lbs. per acre)				
	0	35	70	105	140
R. Simpson	21	23	28	26	28
H. Ashton	33	36	37	35	36
J. Peck	39	38	39	39	41
L. Verchuren	34	34	35	33	34

As indicated in the table, yield responses to nitrogen were obtained only at the Simpson and Ashton farms. No yield response resulted at the other two locations. Nitrogen deficiency symptoms on the check plots (plots with no nitrogen) throughout the growing season were evident to a moderate degree at the Simpson farm, and very slightly evident at the Ashton location. No colour nor growth differences were evident on any of the plots at the Peck and Verchuren trials.

No bronzing or root rot ratings ere taken on the plots in 1971.

HARVEST QUALITY IN WHITE BEANS

Dr. L. Nelson, Extension Agronomist
Michigan State University, East Lansing

When the white man first came to the Great Lakes Region he found that the dry field bean was produced throughout the area by the Indians. Since that time, the dry bean production, on the American side, has become concentrated in Michigan where it is the state's most valuable cash crop. It is grown on over 600,000 acres annually and is worth more than 50 million dollars. Michigan produces over 95% of the U.S. navy bean crop and the bulk of the production is in 6 counties.

One of the reasons for Michigan's comparative advantage is the long-time emphasis on bean quality. Quality is the single most important topic in the Michigan bean research, education and industry programs. In the dictionary, quality is illustrated under seventeen different headings. Clearly, the word "quality" means different things to different people. Perhaps the simplest way to convey the meaning would be to change to a different word. My definition of bean quality is "an assemblage or selection of those characteristics which have been identified by the consumer as being desirable in the bean products they consume".

Mechanical damage is the principle quality problem in Michigan beans at the present time. However, foreign materials such as glass, soil particles and mixtures of corn or soybeans are also important.

The wide-spread use of early-maturing bush beans and modern harvesting and handling are two of the reasons which make mechanical damage a serious problem to bean seeds. The problem is intensified in years of dry, bright weather at harvest. Damage that begins on the farm is compounded at the elevator, in transport during changing weather conditions, in the elevators and processing plants as the beans are prepared for canning.

Mechanical damage is the problem to everyone from the grower to the processor. Mechanical damage takes two forms - breakage of skins and cotyledons. In the severe form splits develop and in the less severe form the seed is damaged - although the damage may not be apparent until the seed germinates. Damaged seed results in plants that are not normal. Bald-head plants result when the growing point is damaged. Planting damaged seeds result in thin stands that do not ripen evenly. Seedlings from damaged seed are less thrifty than most normal seed. Also weeds are more of a pest in these fields since the bean plants are not as competitive as those from undamaged seed. When a farmer

plants undamaged seed he has a better chance of growing thrifty plants and handle better in harvest operations. Beans that are properly handled through the growing and harvest season end up with bright, clean and whole beans in the bin.

Important harvest tips are: consult the combine manual for adjustments and operation recommendations; pull beans before they dry down to a low moisture; rake beans into large fluffy windrows and if dry and hot thresh during morning or mid-day periods when the beans have some surface moisture. Under very dry conditions, use the slowest possible cylinder speed needed to separate the seed from the straw.

The elevator operators, the shipper and processor have the responsibility to maintain wholeness and cleanliness of the bean that is delivered to them. Beans are fragile, especially when handled at 15% moisture or less. They are easily damaged by dropping them on floors of storage silos, running them through cleaning equipment and conveyors at high speeds, handling at low temperatures and bulk handling with improper equipment. Rough handling at dockside and aboard vessels for overseas shipment is a further cause of damage.

To the processor mechanical damage means chipped and checked seed-coats. Further handling leads to additional damage - the check seed-coats become loose skins and some become splits. In the canning process split seeds can become mushy and solids are released into the fluids. The damaged beans produce a highly disintegrated and unattractive product, while the undamaged beans retain wholeness when canned.

In this discussion I have attempted to emphasize the sources of mechanical bean damage from production to processing and the consequences of these damages.

SUMMARY

SOUTHWESTERN ONTARIO FARMERS' WEEK AT RIDGETOWN COLLEGE OF AGRICULTURAL TECHNOLOGY

TAXES and MONEY MATTERS
Tuesday January 11, 1972

ONTARIO DEPARTMENT OF AGRICULTURE & FOOD
PARLIAMENT BUILDINGS, TORONTO

EVERETT BIGGS/DEPUTY MINISTER   HON. WM. A. STEWART/MINISTER

FOREWORD

The Southwestern Ontario Farmers' Week is a result of the deliberations of many individuals beginning in early October. Most segments of the agricultural community of Southwestern Ontario are represented with the emphasis on the farming sector.

The sessions containing discussion on current topics of interest to many people are repeated each day so that as many as possible may participate. A summary of each presentation is contained in this booklet. It is hoped that this information will be of use to each and every farmer interested.

Among the organizations responsible for the planning of the 1972 Farmers' Week are:

Soil and Crop Improvement Associations, Milk Committees and Beef Improvement Associations of the Counties of Essex, Kent, Lambton, Elgin and Middlesex

Kent Vegetable Growers' Association

Essex Vegetable Growers' Association

Ontario Bean Producers' Marketing Board

Ontario Soya-bean Growers' Marketing Board

Ontario Department of Agriculture and Food

Harrow Research Station (Canada Department of Agriculture)

We, at the Ridgetown College of Agricultural Technology, are pleased that the planning committee has seen fit to make use of the facilities available here at the College.

If farmers should want to contact research personnel at the Harrow Research Station, or the Ridgetown College of Agricultural Technology, the staffs of both stations are listed with the specific area in which they conduct research.

Harrow Research Station

Canada Department of Agriculture

Department and Personnel	Area of Research
CHEMISTRY AND WEED SCIENCE	
Dr. G .M. Ward	Head of Section Greenhouse vegetable crops. Nutrition, production, biochemistry of tomatoes and cucumbers.
Dr. A.S. Hamill	Effect of herbicides on weed species and weed population shifts, influence of weed competition on crop yields.
Dr. P.B. Marriage	Herbicide physiology and persistence.
Dr. W.J. Saidak	Weeds, weed control, herbicide evaluation and herbicide translocation.
Dr. F.G. von Stryk	Pesticide chemistry. Residue analysis, systemic insecticides, fungicides, herbicides.
CROP SCIENCE	
C.G. Mortimore	Head of Section Corn breeding, stalk rot research, agronomic studies.
L.J. Anderson	Variety testing of corn, soybeans, and cereals.
Dr. J.W. Aylesworth	White bean breeding and production practices.
Dr. B.R. Buttery	Soybean physiology and biochemistry.
Dr. R .I. Buzzell	Soybean breeding and genetics, agronomic studies.
W.A. Scott	Burley tobacco management.
ENTOMOLOGY	
Dr. C.D.F. Miller	Head of Section Cereal and forage crop insects (Cereal leaf beetle - Alfalfa weevil)
Dr. W.M. Elliott	Vegetable insects (peach aphid, *Myzus persicae*) on potatoes.
Dr. W.H. Foott	Field crop and vegetable insects (Corn leaf aphid - Sap beetle)
Dr. R.P. Jacques	Insect pathology. (Cabbage looper - cabbageworm)
Dr. P.W. Johnson	Plant parasitic nematodes. (Root-knot nematode - lesion nematode on greenhouse vegetables)

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Department and Personnel	Area of Research
Entomology - continued	
Dr. R .J. McClanahan	Greenhouse insects. (Two-spotted spider mite - greenhouse whitefly, integrated control)
H.B. Wressell (Chatham)	Field crop and vegetable insects. (Insects on white beans, corn and tomatoes)
HORTICULTURAL AND SOIL SCIENCE	
Dr. J.M. Fulton	Head of Section The water requirements of crops, soil moisture, irrigation, evapotranspiration.
Dr. E .F. Bolton	Soil physics, cropping systems, cultivation, tillage, soil aeration and drainage.
Dr. W.I. Findlay	Soil fertility maintenance, build up and decline; crop fertilizer requirements, and time of application.
Dr. R.E.C. Layne	Tree fruit breeding. Winterhardiness. Disease resistance. Peach rootstocks.
V.W. Nuttall	Vegetable breeding. Genetics. Greenhouse and pickling cucumber breeding.
Dr. H.A. Quamme	Tree fruit breeding. Fireblight resistance of pear. Cold-hardy dwarfing rootstocks for pear.
PLANT PATHOLOGY	
Dr. C.D. McKeen	Head of Section Greenhouse and field vegetable diseases. Verticillium wilt. Evaluation of fungicides on vegetables.
Dr. B.N. Dhanvantari	Tree fruit diseases. Peach canker, bacterial leaf spot of peaches and apricots. Crown gall.
Dr. John Dueck	Bacterial diseases of fruit and vegetable crops. Fireblight of apple and pear. Bacterial spot of pepper.
Dr. L.F. Gates	Corn root and stalk rot and other corn diseases. Viruses of cereals and legumes.
Dr. J.H. Haas	White bean and soybean diseases. Bacterial blights, bronzing and root rots.
Dr. R.N. Wensley	Soil microbiology. Fusarium wilt and root rot diseases of melons, asparagus and other vegetable crops.

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Ridgetown College of Agricultural Technology

Ontario Department of Agriculture and Food

Department and Personnel	Area of Research
AGRICULTURAL ENGINEERING	
P.H. Bomford	Head of Department. Corn and Soybean harvest losses. Grain drying systems.
R.E. Clayton	Extension engineer (Kent County) in farm buildings, farm drainage and farm machinery.
M. Sojak	Environmental control (ventilation). Drainage systems (durability of plastic drains and drain maintenance. Specialized machinery.
BIOLOGY AND HORTICULTURE (and weed control)	
R.H. Brown	Head of Department. Evaluation of chemical weed control in corn, burley tobacco, asparagus, red beets, tomatoes and strawberries. Control of Quackgrass and fall panicum.
Dr. B. Bolwyn	Insect and disease control in corn (Northern corn blights, rootworm) white beans (white mold).
J.K. Muehmer	Variety evaluation and production techniques in processing crops (sweet corn, tomatoes, peppers, cucumbers).
J.E. Shaw	Evaluation of chemical weed control in soybeans, white beans, kidney beans, lima beans, cereal grains, alfalfa, cucumbers, potatoes. Control of velvetleaf, Jimsonweed, and Black Nightshade.
CROPS	
A.D. McLaren	Head of Department. Variety evaluation and production techniques in corn and forages.
R.C. Jenkinson	Variety evaluation and production techniques in cereals and winter wheat and spring wheat.
D.A. Littlejohns	Variety evaluation and production techniques in soybeans and white beans.
A.K. Brooks	Extension in Crop Production - Middlesex and Elgin Co.
W.W. Parks	Extension in Crop Production - East Kent and Lambton Counties.

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Department and Personnel	Area of Research
FARM MANAGEMENT AND ECONOMICS	
D. Beattie	Head of Department, Farm management and production economics of livestock.
S.J. Usher	Marketing agricultural products, agricultural policies, economics in swine production.
LIVESTOCK AND POULTRY	
D.G. Luckham	Head of Department. Nutrition and egg production, feeding broiler hatching flocks.
J.E. Core	Beef and Dairy rations. Stored feeding programs including stover silage, silage additives.
A.A. Campbell	Chemical components of feed.
J.R. Morris	Selection of swine breeding stock, herd health. Evaluation of additives (protein supplements, antibiotics.) Feeding of high moisture corn stored with organic acid to finishing hogs.
SOILS	
Dr. C.S. Baldwin	Head of Department. Plastic coated corn and spring wheat, nitrogen in spring wheat and white bean production.
R.W. Johnston	Calcium, magnesium, and micronutrients in field crops (corn, soybeans, white beans, and forages).
C.K. Stevenson	Evaluation of nitrification inhibitiors in the nitrogen fertilization of corn. Soil fertility maintenance, time of application of fertilizers.
VETERINARY SERVICES LABORATORY	
Dr. F.J. Harden	Head of Department. Assistance given in diseases of all classes of livestock.
Dr. R.E. Clugston	Assistance given in diseases of all classes of livestock.
Dr. D.A. Stevenson	Assistance given in diseases of all classes of livestock.
AGRICULTURAL LABORATORY TECHNOLOGY	
Dr. J.H. Brimner	Coordinator of course, chemical components of crops and feeds.
AGRICULTURAL SECRETARY	
R.C. Wagner	Coordinator of course. Farm accounting and agricultural policy.

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D.K. ECKEL, C.A.'s TALK ON INCOME TAXES
RIDGETOWN, JANUARY 11, 1972

GENERAL BACKGROUND

On June 18, 1971, the Canadian government introduced its proposed tax reform legislation in a length schedule to the budget speech of the Hon. E.J. Benson, Minister of Finance. Mr. Benson reviewed the events leading up to these proposals, starting with the appointment of the Royal Commission on Taxation in 1962 and the discussions and submissions to the government following release of the Commission's report in the spring of 1967. The government's White Paper on tax reform which was tabled on November 7, 1969, was in turn followed by public debate and review of the proposals by two parliamentary committees. As a result, the government has had presented to it, to an unprecedented degree, the views of Canadians about their tax system.

The Minister outlined the government's views of what a good tax system ought to be. The first stated requisite was that "a tax system must be sensitive to the economic and social needs of this country". A second requirement is that "a tax system must distribute the tax burden in an equitable manner, based upon ability to pay. Furthermore, it must not only be fair, it must be seen to be fair". He also noted that "to be acceptable to all citizens, a tax system must have as few loopholes as possible". and that "a good tax system must lend itself to efficient, economical and objective administration. It must be straightforward in both purpose and method, so that taxpayers know where they stand with a minimum of administration discretion and litigation". As a final point, he noted that "it is essential that the federal tax system be capable of being harmonized with provincial

tax systems". The Minister indicated that it was his belief that the government's proposals not only reflected "a consensus about what Canada's tax system ought to be in 1970's" but also represented "a reform of our tax system which will deal with many of its shortcomings". The debate in the months to come will reveal the extent to which Canadians agree with these views and the extent to which the governement has succeeded in meeting the criteria of what a good tax system ought to be.

The new tax system as set out in the actual legislation tabled for first reading in the House of Commons on June 30, 1971, is not simple or easy to understand. It introduces a great number of new concepts to the Canadian tax system. The most important of these is, of course, the inclusion of capital gains in the income base. This change alone will increase the complexity of the Canadian tax system enormously. Apart from the addition of capital gains to the income base, however, the average Canadian individual will find that the new tax system is in most respects, similar to the old.

The determination of tax liability for business enterprises whether incorporated or unincorporated, will be much more complex under the new system. The most severe problems will be encountered by Canadian-controlled private corporations, and to a lesser extent by partnerships. The detailed provisions of the Act applicable to corporations are complicated in the extreme. These complications in the business cestor stem in large measure from the apparent determination of the government to block tax minimization or avoidance in order to ensure that taxpayers in similar economic circumstances bear similar tax burdens.

The proposed legislation contains many technical words and

phrases which have not heretofore been common in Canada. A general understanding of the meaning of these terms is an essential pre-requisite to a comprehension of the legislation.

SUMMARY OF CHANGES

Individual

The income tax base has been broadened substantially by including one-half of net capital gains in income. A number of further items are to be subject to tax including certain scholarships, fellowships and bursaries, unemployment insurance and other employment benefits.

A number of new deductions are also included. An allowance is to be made for employment expenses of up to $150 per year, child care expenses will become deductible as will moving expenses incurred in connection with a change in job. Personal exemptions are encreased from $2,000 to $2,850 for married persons, from $1,000 to $1,500 for a single person and from $1,000 to $1,350 for a spouse. Dependents exemptions remain unchanged except that a dependent's income over the specified amounts I mention next reduce the exemption gradually instead of eliminating it abruptly as under the present system. This is accomplished in such a way that the taxpayer completely loses the exemption when the spouse's or dependent's income reaches $1,600 at which point the spouse or dependent generally will have become taxable. Where the spouse has income in excess of $250, the $1,350 marital exemption will be reduced dollar for dollar by the excess. The $300 exemption for dependents under age sixteen will be reduced by $1 for each $2 of the dependent's income in excess of $1,000 while the $550 exemption for dependents sixteen years of age and over will be reduces dollar for dollar to the extent of the excess of the dependent's income over $1,050.

The limitation on donation deductions is to be increased from 10% to 20% of income.

The present multiplicity of special taxes are to be consolidated into a single rate schedule which, when combined with greater personal exemptions will result in somewhat lower taxes for lower-income individuals. New tax averaging proposals are to come into effect in 1972 and 1973. These averaging methods will replace most of the existing averaging or optional tax calculation provisions.

Business and Property Income and Losses

While the starting point for the computation of income from business or property continues to be the income determined under generally accepted business and commercial practices, a number of significant new rules have been introduced. Half of the cost of goodwill and other nothings acquired after 1971 will be depreciable at a 10% rate. Half of the proceeds of disposition of goodwill will be taxable with special transitional rules provided in the case of goodwill existing at the start of the new system. Non-arm's-length transactions in depreciable property which, under the present system have been subject to special rules, will generally in future be required to be carried out at fair market value.

Capital Gains

One-half of capital gains accruing after 1971 will be included in income when realized and one-half of capital losses will be deductible against capital gains. Individuals may also claim up to $1,000 per year in respect of capital losses against other income. Capital losses not deductible in the year may be carried back one year and forward indefinitely.

Provision is made to exempt most gains on a taxpayer's principal residence from tax although there are a number of circumstances in which such gains will be taxable in whole or in part. In the case of farmers a $1,000 per year allowance on his farm has been provided for. Gains on property held primarily for personal use or enjoyment will be taxable but losses on such property will generally not be deductible. An exception is made in the case of certain types of property, such as works of art, stamp and coin collections, on which losses may be offset against gains from the same type of property in the proceding year and the following five years.

In most cases, the tax on capital gains will apply only when a taxpayer has sold property or has received proceeds of disposition in respect of loss or destruction of the property. There are, however, some exceptions. A taxpayer will generally be deemed to have disposed of his property at its fair market value at the time of his death and a any accrued gain will be taxable. Where the property is bequeathed to the taxpayer's spouse or to a trust for the spouse, any accrued gains or losses will not be realized but rather, the spouse or trust will take over the assets at their adjusted cost to the deceased. Where property is disposed of by gift, the taxpayer will be deemed to have sold it at its fair market value except where the property is given to the taxpayer's spouse or to a trust for the spouse. A taxpayer leaving Canada and becoming a non-resident will be deemed to have disposed of any property on which he would not be subject to tax as a non-resident of Canada. Trusts will generally be deemed to have disposed of all of their assets every 21 years and will pay tax on any accrued gains.

The amount of any capital gain will be measured by comparing the proceeds of disposition with the cost of the asset adjusted for

certain transaction accruing after the taxpayer has acquired it. In cases where the property was held by a taxpayer at December 31, 1971, the cost will be greater of actual cost to the taxpayer or its fair market value on Valuation Day for purposes of computing a gain and the lower of its actual cost or its value on Valuation Day for purposes of computing a loss. Detailed transitional rules provide for the maintenance of the tax-free neutral zone between the cost of a property and its fair market value on Valuation Day until such time as the property is disposed of in an arm's-length transaction.

A disposition of property is defined in the new legislation to include transactions or events that entitle a taxpayer to proceed of disposition as previously defined. Since events that are not dispositions in the ordinary sense of the word may give to proceeds of disposition (e.g. insurance or other claims for damaged property and compensation for property injuriously affected) their will be occasions when a taxpayer is required to face a tax on capital gains although the property had not been disposed of.

Where a taxpayer has received proceeds of disposition in respect of property that has been destroyed or expropriated he may be entitled to roll-over the cost of the destroyed or expropriated property. The rollover will be permitted if the taxpayer gives evidence of his intention to replace the property by expending an amount to acquire a replacement property before the end of the year following that in which he received the proceeds of disposition. In such circumstances the gain on the disposition of the destroyed or expropriated property will be the lesser of:

(a) the excess of the net proceeds of the disposition over the

adjusted cost base of the property destroyed or expropriated, or

(b) the excess of the proceeds of disposition over the cost of the cost of the replacement property.

While the taxpayer must expend amounts on the replacement property within the specified time, it is apparently the actual cost of the replacement property that is to be considered regardless of whether all costs of replacement have been expended within the time period.

The cost of the replacement property is deemed to be its actual cost less any amount by which (a) above exceeds (b) above. Thus in any case where all or a portion of the gain is rolled over the deemed cost of the replacement property will be the adjusted cost base of the old property plus any excess of the cost of the replacement property over the net proceeds of disposition.

It should be noted that where the net proceeds of disposition are less than the adjusted cost base of destroyed or expropriate property, the taxpayer will recognize the loss in the year of disposition and the adjusted cost base of the replacement property will be its actual cost.

Non-Arm's Length Transactions

The general rule is that non-arm's length transactions are to be carried out at fair market value. There are a limited number of circumstances in which the new legislation permits a rollover. These situations include the incorporation of the farm business, of a proprietorship or a partnership where the proprietor or partnership owns at least 80% of the issued shares of all classes of the corporation immediately following the transfer of property to it. Transfers of property by a corporation to an 80% or more owned subsidiary and the winding-up of a wholly-owned subsidiary are also eligible for a rollover.

Corporations

These are a subject unto themselves and are much too complicated to disucss here. If anyone has any questions after, I shall be pleased to try to answer them.

Partnerships

Partners will continue to be taxable on their share of the income of a partnership but in future, deductions for capital cost allowances will be determined at the partnership level rather than in the hands of the individual partners. Several rules are provided to deal with transfers of property to and from a partnership by the partners and to effect the transition from the present system to the new system with respect to depreciable property and the cost base of a partnership interest. Rules are also provided to deal with the transition from a cash basis to an accrual basis.

The new legislation does not introduce a definition of a partnership. With the introduction of new rules that are considerably more comprehensive and complex than before, it will become even more important to determine whether a partnership does, in fact exist. This issue will become critical, for example, in determining whether a particular joint endeavour or joint venture constitutes a partnership and as a consequence whether property transferred to or from such a venture will be subject to the new rule that treats such a transfer of property as sale at fair market value, resulting perhaps in taxable capital gains or in recaptured capital cost allownaces. In such circumstances, it will be highly desirable that comptent legal advise be obtained to determine the status of the undertaking, preferably in advance of completing contemplated transactions.

It will be necessary to determine, on the facts of each situations,

whether or not an individual is a partner subject to the rules applicable thereto, or whether he is an employee rendering service to the partnership, perhaps with profit participation or whether he may be regarded as a self-employed person providing consulting services to a partnership.

Each partner is entitled at present to claim capital cost allowance on his interest in depreciable property of the partnership. He may claim, or postpone claiming, capital cost allowance independently of whether or not the other partners claim allowances on their interest in such property. In some cases, as a matter of convenience, partnerships have deducted capital cost allowance in arriving at income allocated to individual partners although, in fact, each partner was not obliged to adhere to the capital cost allowance claim thus allocated to him.

The new legislation requires that capital cost allowances on depreciable property owned by a pertnership be claimed at the partnership level and may not be claimed by each individual partner. As a result, partners will henceforth have to agree among themselves on the amount of capital cost allowance to be claimed by the partnership. The amount thus claimed will be deducted in computing the income of the partnership and the resulting net income will be allocated to partners in accordance with their respective interest. An individual partner will not be free to vary the amount of capital cost allowance that has been claimed and attributed to his interest. As a result partners will not have the same degree of flexibility in the future in deciding on the amount of capital cost allowance to be claimed.

Detailed rules are provided to compute the capital cost and the undepreciated capital cost to the partnership of depreciable assets of a prescribed class owned by a partnership at December 31, 1971. These rules are necessary because of the likelihood of differing balances of

such amounts in the hands of individual partners and to provide a starting point for future capital cost allowances to be claimed by the partnership.

If a partner owns depreciable property in his own right (such as an automobile) and uses that property to earn partnership income, he is entitled at present to claim capital cost allowance on that property. It appears that this right will be continued.

If a partner incurs expenses for the purpose of earning partnership income, but is not reimbursed by the partnership, he is at present entitled to deduct such expenses from his share of the partnership income. Although the issue is not entirely clear, it appears that expenses borne by individual partners to earn partnership income will continue to be deductible to the same extent as before. A partnership will not be able to deduct depletion allowances or exploration and development expenses. The partners will make such deductions on an individual basis.

With the introduction of a tax on capital gains, complex rules have been introduced to deal with situations where property is transferred to a new or an existing partnership and where property is transferred from an existing partnership to a continuing partner, to the heirs of a deceased partner or to a former partner following withdrawal or retirement.

The new legislations includes a general rule that all transfers of property to or from a partnership will be deemed to have taken place at fair market calue, thus generallly resulting in a gain or loss to the transferor. If the fair market value of property transferred to a partnership exceeds the value of any considerstion (other than an interest in the partnership) received by a partner, the difference will represent a capital contribution by the partner to the partnership which will be

added to the adjusted cost base of his partnership interest. Equally, if a partner receives property from a partnership the value of that property in excess of any consideration given by the partner (other than a reduction or a relinquishemnt of his interest in the partnership) will constitute a withdrawal of profits and capital and the adjusted cost base of his interest in the partnership will be reduced accordingly.

The legislation allows exceptions to this fair value rule to Canadian partnerships and their partners if certain conditions are met. These exceptions can be summarized as follows:

(1) A partner may contribute property to a Canadian partnership (i.e. a partnership in which all partners are resident in Canada) without realizing a gain or loss by electing (together with all other partners) that the property be transferred at its cost amount to him. The partnership's cost of those assets will be the partner's cost amount provided that all the partners so elect. Alternatively, the partners may elect that the property be transferred at any amount not in excess of its fair market value and not less than the actual consideration received by the partner in which case the transferring partner will be required to recognize his gain or loss. The cost of the property to the partnership will be equal to the elected amount.

(2) On dissolution (usually caused by death or withdrawal of one or more partners or by an outright cessation of the partnership) a partnership may distribute its property to the partners without recognizing any gain or loss. Generally, the assets of the partnership will pass to the partners on the following basis:

(a) Where the cost amount to the partnership of the assets distributed to a partner is greater than the adjusted cost base to the partner of his partnership interest, a capital gain will be realized by the partner

to the extent of the difference and the partner will take over the partnership's cost of the assets.

(b) Where the cost amount to the partnership of the assets distributed to a partner is less than the adjusted cost base to the partner of his partnership interest, no taxable capital gain or allowable capital loss will result. Within prescribed limits, the difference between the adjusted cost base of his partnership interest and the cost amount of the assets distributed to him can be allocated to those assets.

(3) In cases where a partnership dissolves as a result of the retirement or death of one or more partners and the remaining partners carry on the business of the former partnership using substantially all of its property in the new partnership, the new partnership will be deemed to be a continuation of the old. Accordingly, neither the former partnership nor the continuing partners would be treated as having realized any gain or loss.

(4) Where a partnership dissolves and one of the remaining partners carries on the business of the partnership using property of the former partnership, the proprietor will deal with his former partnership interest and with property received from the partnership in a manner similar to that described in (2) above.

The transfer of the assets and business of a partnership to a corporation can be accomplished without giving rise to any gain or loss if on completion of the transfer, the partnership owns 80% or more of each class of the capital stock of the corporation and all of the partners and the corporation elect to have prescribed rules applied.

If the partnership is wound up within sixty days of the transfer of its property to the company, the cost of the shares and other property received by a partner from the partnership will be deemed to be an amount

equal to the adjust cost base of his interest in the partnership except in cases where the fair value of property received, other than shares, is greater than the adjusted cost base of his partnership interest. Such an excess will be treated as a gain realized on the disposition of his partnership interest.

Estate and Gift Taxes

The Bill made the Estate Tax Act inapplicable in the case of the death of any person after 1971 and also made the gift tax provisions of the Income Tax Act inapplicable to gifts made after 1971. The proposed abandonment of gift and estate taxes by the federal government has been looked after by Ontario already in the following ways:

1. The rates of duty applicable to all classes of beneficiaries is doubled;

2. The existing surtax of 20% for collateral beneficiaries and 25% for strangers is eliminated;

3. The exemption for widows and widowers is increased to \$500,000 from \$250,000. The corresponding credit, when duty is payable, is increased to \$125,000 from \$23,950 for the surviving spouse, to \$1,500 from \$750 for each dependent child where there is a surviving spouse and to \$2,500 from \$1,250 for each orphan dependent child;

4. All estates valued up to \$100,000 are not subject to duty, regardless of their distribution;

5. Dispositions (gifts) made within fifteen years prior to the death of the deceased are included as property of the deceased passing on his death if made on or after January 1, 1972. The present 5-year period will continue to apply where dispositions are made prior to January 1, 1972.

Comparison of the Rate Structures of the Old and New Tax Systems

A simple comparison of the rate structure of the old and new tax systems can be misleading of the substantial changes being made in the tax base. It is difficult to make general comparisons because of the differing impact of all of the changes on different tax payers. Even a comparison of the position of a taxpayer having income from a single source (e.g. employment income) can be misleading because of the various deductions such as unemployment insurance, child care expenses, etc. to which he may be entitled. Nevertheless, the following illustrations set out the approximate positions of taxpayers who have only employment income.

Income before exemptions or deductions	Single Taxpayer - no dependents			Married Taxpayer - two dependents under age 16		
	*1971 tax	#1972 tax	Change from 1971 to 1972	*1971 tax	#1972 tax	Change from 1971 to 1972
$ 3,000	$ 318	$ 304	$(14)	$ 12	$	$ (12)
5,000	811	803	(8)	414	302	(112)
8,000	1,640	1,654	14	1,204	1,089	(115)
10,000	2,205	2,285	80	1,746	1,669	(77)
12,000	2,861	2,967	106	2,327	2,301	(26)
15,000	4,022	4,137	115	3,373	3,351	(22)
20,000	6,251	6,373	122	5,520	5,486	(34)
30,000	11,016	11,144	128	10,204	10,156	(48)

* The 1971 tax calculation reflects the reduction of the 3% surtax to 1½%, includes the 4% old age security tax and the 2% social development tax and utilizes the revised rates applicable to 1971 taxable incomes under $3,000. The standard deduction of $100 has been deducted but no other adjustments to income have been made. Provincial taxes have been computed at 28%.

\# The standard employment deduction of 3% up to a maximum of $150 and the standard deduction of $100 have been taken, but no other adjustments to income have been made. Provincial taxes have been computed at 30%.

FARMERS

Cash Basis of Computing Income

Farmers continue to be allowed to compute their income on the cash basis.

Basic Herds

With the introduction of the taxation of capital gains the basic herd concept is out. Under this concept, the basic herd has been

considered to be a capital asset and any profit or loss on the sale of animals from the basic herd was considered to be a non-taxable capital gain or a non-deductible capital loss. Under the new legislation, farmers have to include in income the excess of the proceeds on sales out of the basic herd over the fair market value of the animals in the herd on December 31, 1971.

Farmers will be able to establish or add to a basic herd up to December 31, 1971. The present rules for establishing a basic herd are contained in an information circular and provide that animals received by way of gift or inheritance, or purchased but for which no amount has been deducted from income, can be included in the basic herd. A farmer can also, at present, increase his basic herd by the natural increase in the herd if he adds to his income for the year the market value of the equivalent mature animals by which the herd is being increased. No basic herds can be established after December 31, 1971 nor may additions be made to an existing basic herd after that date.

The legislations provides that the proceeds of all sales of animals after December 31, 1971 will have to be included in income whether or not the animal is sold out of the basic herd. The basic herd may be reduced in any year by any number of animals not exceeding the least of:

(a) the total number of animals of that class sold during the year;

(b) 1/10th of the basic herd at December 31, 1971, and

(c) the number of animals in the basic herd at the end of the immediately preceding year.

In the event that the number of animals remaining in the basic herd after this reduction is greater than the number of animals of that class actually on hand at the end of any year, a further deduction must be made to reduce the basic herd to the number of animals actually on hand.

As the basic herd is reduced, the farmer will be permitted a charge against income computed by reference to the average market value of the animals in the basic herd at December 31, 1971. This will result in providing the farmer with a tax-free return of the December 31, 1971 value of his basic herd, as he sells animals under the new system.

Depreciation

Farmers will no longer be allowed to use the straight-line basis of calculating capital cost allowances on assets acquired after December 31, 1971 and as a result will lose their exemption from recapture capital cost allowances. However, farmers may continue to depreciate assets acquired before that date on the same basis as before and those depreciated on the straight-line basis will not be subject to recapture although a taxable capital gain could result if these assets are sold at a price higher than the greater of fair market value on valuation day or original cost.

Income Averaging

Farmers and fishermen will continue to be allowed to use the present five-year block-averaging system under which they can elect to compute tax on an amount equal to the average income for a five-year period. Farmers and fishermen will be allowed to use the general averaging method described in Chapter B but not for any years in which the five-year block-averaging has been used. Farmers and fishermen will also be able to use forward averaging should they receive any of the eligible special types of income.

Valuation Day and the Tax Free Zone

Two valuation days have been established - December 22nd for the shares of publicly-traded Canadian corporations and December 31st for other assets subject to capital gains, including foreign securities,

bonds, land, cottages, art collections and the like.

The individual taxpayer has the option to take V-Day value for gains tax purposes for all his assets. He may choose to do this if he no longer has records of his original costs, or if it is otherwise to his advantage.

Once he has made this election, he cannot subsequently take advantage of the other method of valuation - popularly known as the tax-free zone.

Under this method, the individual taxpayer may use either the tax-free zone (related to original cost) or V-Day value in calculating future capital gains and losses.

In practice, many taxpayers are likely to opt for the more flexible zone method in which capital gains are based on the higher of cost or V-Day value, and capital losses on the lower of cost or V-Day value. There is no gain or loss for tax purposes if an asset is sold in the zone between original cost and V-Day value. Here's an illustration:

Suppose a share of stock was bought at $10, has a V-Day value of $15 and is sold after January 1 for $20.

The shareowner will be taxable on half of the $5 gain from $15 to $20. If, however, he sells the stock for $8, the deductible capital loss will be half of $2 - that is, the difference between the lower of cost or V-Day value, in this case the $10 cost and the selling price. But if he sells it for $12 - that is for an amount between the original cost and V-Day value in the so-called tax-free zone - neither a capital gain nor a capital loss results for tax purposes.

<u>TREATMENT OF SPECIAL ASSETS</u>

<u>Personal Use Property</u>

The general rule applicable to personal-use property is that gains on such property will be taxable but that losses will not be deductible. An exception is provided for a category of personal-use property described as "listed personal property" on which there will be a limited deduction in respect of losses.

To avoid the necessity of taxpayers maintaining detailed records of the cost of personal-use property which would be necessary to compute gains on disposition or establish that there had been no gain, such property is deemed by the new legislation to have an adjusted cost base of the greater of $1,000 or the actual adjusted cost base. No capital gain can arise in any case where the proceeds of disposition are less than $1,000. For example, if a set of furniture which initially cost $600 is sold for $1,500 the capital gain for tax purposes will be $500 based on an assumed cost of $1,000. If the furniture cost $1,200, the capital gain would be $300.

To counteract avoidance, the Bill contains special provisions to prorate the minimum $1,000 adjusted cost base in cases where only part of a property is disposed of. Where personal-use property would normally be disposed of as a set but the set has been disposed of in a number of separate transactions to one person or to a related group of persons, the set will be treated as one property, each disposal will be treated as a disposal as part of the property and the $1,000 minimum adjusted cost base will be prorated accordingly.

Listed Personal Property

The distinction between listed personal property and other personal-use property is important only for the purpose of determining the income of a taxpayer when he has suffered a loss on the disposition of listed personal property. Listed personal property is defined as personal-use

property that is any -

(a) print, etching, drawing, painting, sculpture, or other similar work of art;

(b) jewellery;

(c) rare folio, rare manuscript, or rare book;

(d) stamp, or

(e) coin.

Gains on listed personal property are determined under the rules for personal-use property outlined above, under which such property is deemed to have a minimum cost of $1,000. For the purpose of computing losses, the proceeds of disposition are to be taken as the greater of $1,000 or the actual proceeds. Thus, if a taxpayer acquired a painting for $1,500 and later sold it for $700 his real loss of $800 would be ignored and his capital loss of $500 would be computed by deducting deemed proceeds of $1,000 from the adjusted cost base of $1,500.

Losses on listed personal property are to be deductible only from gains on listed personal property. To the extent losses in any year exceed gains in the year they may be carried back one year and forward for five years. This carry-over provision is somewhat different from the carry-over provisions for capital and non-capital losses since any listed personal property loss is a deduction in computing income rather than taxable income for the year. This is accomplished by including in income, a taxpayer's taxable capital gains from dispositions of capital property other than listed personal property and his"taxable net gain for the year from dispositions of listed personal property". The taxable net gain for the year from dispositions of listed personal property is one-half of:

(a) the taxpayer's capital gains less capital losses from dispositions of such property in the year,

less

(b) the taxpayer's capital losses from dispositions of listed personal property in the five immediately preceding years and the following year to the extent such losses were not deductible in those years.

TAKING ADVANTAGE OF THE PROVISIONS OF THE INCOME TAX ACT

W. A. Gregory, Chartered Accountant,
Ridgetown

SUMMARY

Under the present Income Tax Act, farmers are granted preferential tax treatment in fours areas: (1) they may compute their income on a cash basis; (2) livestock farmers may treat portions of their herd as capital assets, i.e. the "basic herd"; (3) they may claim capital cost allowance (depreciation) on the straight-line basis and exclude from income any difference between the proceeds of sale of an asset and its depreciated cost; (4) farmers may average their incomes every five years. The proposed Act continues, with limitations, both the cash basis of computing income and the five-year averaging provisions; however, as capital gains will in future form part of the tax base, the special provisions for basic herds and straight-line depreciation are to be phased out.

ACCOUNTING

Proper accounting techniques will aid a farmer to measure the efficiency of his farm operations.

CASH BASIS FOR INCOME TAX PURPOSES

Income is taxable only when realized in cash. The averaging of income makes allowances for fluctuating income. The cash basis has most of the advantages of the accrual basis, without the disadvantages.

AVERAGING

The five-year averaging which is allowed under the present tax act is to be permitted under the new tax reform.

DEPRECIATION

Straight-line depreciation, without recapture on disposal, will be permitted under the new tax reform on depreciable assets purchased before 31st December 1971. For assets acquired after 31st December 1971, the dimishing balance method must be used.

BASIC HERD

Livestock farmers will be allowed to establish a basic herd as at 31st December 1971 but after that date no additions may be made to the basic herd. Any gain accrued to 31st December 1971 will, when realized, be treated as a tax from capital gain, with proceeds in excess of the basic herd value at 31st December 1971 being treated as ordinary income.

INCORPORATION

The advantages and disadvantages of the corporate form of organization for a farm depends greatly on individual circumstances.

TAX INSTALMENTS

On or before the 31st December of each year farmers are required to pay an instalment of tax equal to two-thirds of the tax payable on either estimated taxable income for the year or the actual taxable income of the preceding year.

FARMER'S RESIDENCE

The proposed Act exempts from capital gains tax the increase in value of a taxpaper's principal residence.

ESTATE PLANNING OR FAMILY FARM BUSINESS PLANNING

G. Mel Hanna, C.L.U.

Reasons why farmers do little or no Estate Planning or Family Farm Business Planning: (Given by a farm business administration course in 1970)

1. Do not understand the meaning, and do not realize the value of estate planning.
2. Hesitant to disclose personal affairs in case this information gets back to neighbours, particularly income tax department.
3. Present day farmers in many cases received farm from fathers, without any problems, and do not realize how land values, etc., have increased and the problems to be faced when they leave the farm to their sons; underestimate total value of estate.
4. Many consider the use of professional advice as an admission of personal incompetence.
5. Ashamed of the unfavourable impression made with a professional advisor by his gross neglect.
6. Confliction of advice received from lawyer and accountant, when advice requested is out of context with the overall problems.
7. Something they know little about, therefore, they would rather remain ignorant of the facts.
8. Afraid to hand over reins to the son.
9. Afraid of the cost involved in Estate Planning.
10. Do not know where to get Estate Planning done.

SUCCESSFULL FARM BUSINESS OPERATORS SHOULD CONSIDER FAMILY FARM BUSINESS PLANNING EARLY IN 1972 TO MAKE SOME SIZEABLE FUTURE TAX SAVING

Who should be giving this matter serious consideration:

- Farm operators - (Sole proprietors, partners, or incorporation) with sons or daughters involved in the farm business.
- Farm operators - with high taxable income and/or high net assets and infant sons and daughters.
- Farm operators - who plan to sell out to a stranger.

REQUIREMENTS TO MAKING DECISIONS

- Complete analysis of present estate showing net assets, estimated liabilities, including accrued income taxes, succession duties, capital gains, gift taxes, income potential of assets in regards to retirement or death.
- Projection of present assets and liabilities to retirement.
- Dates of birth of each member of family and the individual objectives for each member of the family.
- Copies of income tax returns from 1966 - 1971, partnership agreements, articles of incorporation, buy and sell agreements, and copy of Will.

Most farmers when considering what they should do take one question and go to their accountant or lawyer. Usually they will get the right answer to the question asked., However, without presenting the total picture and going to an accountant or lawyer who understands special farm problems the chance of getting the correct answer in relation to your overall position is less than 10%. From personal experience, I am spending 50% of my time straightening out farm partnerships and corporations that were made up by accountants and lawyers not fully aware of the individual farmer's special problems.

IMPLICATIONS TO FARMERS OF NEW BILL 259C

POINTS TO CONSIDER:

Capital Gains - 50% of capital gains from December 31, 1971 will come into income with the exception of:

1) The legislation exempts a taxpayer's principal residence, together with up to an acre of surrounding land if the land "contributes to the use and enjoyment" of the home as a residence.

2) In some cases the complete exemption of a farmer's farm house and one acre may be less beneficial to him than the White Paper formula for a $1,000 annual deduction against gains on his farm house and all his farm property. He may choose either formula.

Goodwill - Milk quotas, broiler quotas, and tobacco acreage rights will be considered as goodwill after January 1, 1972.

Proceeds on sale of goodwill owned at the commencement of the new system will be included in income to the extent of 20% if sold in the first year, 22½% if sold in the second year, 25% if sold in the third year, and so on, until the thirteenth and subsequent years when 50% of the proceeds will be included in income.

Quotas purchased after January 1, 1972, 50% of the cost will be eligible for depreciation at 10% per year on diminishing balance. On sale of quota purchased after January 1, 1972 50% of selling price of quota less undiminished balance will be included in income.

Basic Herd - Livestock farmers will be able to establish a basic herd as at December 31, 1971, but no additions may be made to the basic herd after that date. The accrued gain on a basic herd as at December 31, 1971 will be a tax-free capital gain, as under the present law. When livestock is sold after December 31, 1971 a farmer may consider the sale as being out of the basic herd or the other herd, subject to special rules, but the legislation requires that the sale reduce the basic herd when the total livestock on hand is less than the remaining total of the basic herd. The proceeds in excess of the value of the basic herd on Valuation Day will be treated as part of farming income.

Computing Income on Cash Basis - The new legislation continues to permit farmers and fishermen to compute their income on a cash basis and to average their income every five years. However, this special averaging provision will be related to the new general averaging and the income averaging annuity provisions so that farmers may use the system most beneficial to them.

Depreciation - Straight-line depreciation will continue to be available for assets acquired before the new system starts. Depreciation will be calculated on the diminishing balance system for assets acquired after December 31, 1971. If the assets depreciated on a straight-line basis are subsequently sold for more than original cost or Valuation Day value, the difference will be a capital gain.

NEW SUCCESSION DUTY

Changes effective in respect of deaths occurring after midnight, December 31, 1971:

1. RATES OF DUTY -

   The rates of duty applicable to all classes of beneficiaries i.e. preferred, collaterals and strangers will be doubled.

2. SURTAXES -

   The existing surtax of 20 per cent for collateral beneficiaries and 25 per cent for strangers will be eliminated.

3. ESTATES VALUED UP TO $100,000 WILL NOT BE SUBJECT TO DUTY -

   No duty will be payable on an estate valued up to $100,000, regardless of the distribution, instead of the present $20,000 where such property passes to collateral beneficiaries and the present $10,000 where property passes to stranger beneficiaries.

4. INCREASE IN WIDOWS' AND WIDOWERS' EXEMPTION -

   The exemption for widows and widowers will be increased from $250,000 to $500,000. The corresponding credit, when duty is payable, will be increased from $23,950 to $125,000.

5. DISPOSITIONS MADE AFTER DECEMBER 31, 1971 -

   Dispositions (gifts) made within fifteen years prior to the death of the deceased will be included as property of the deceased passing on his death if made on or after January 1, 1972. The present five year period will continue to apply where dispositions are made prior to January 1, 1972.

6. Any estate not going to widow or widower over $170,000 will pay more Succession Duties than under previous rates.

FARM INCORPORATIONS

I think we often regard farming as something entirely different from a business. Farming is a business with some differences to other businesses, but no more differences than there are between, for example, a retail business and a manufacturing business. Normal good commercial practices apply with as much validity to the farming business as to other businesses. Therefore, the desirability of the following aspects of corporate operation and organization apply to farming:

(a) Limited Liability

To the extent that this advantage is not offset by guarantee requirements of banks and other major creditors.

(b) Continuing Existence

The existence of the corporation is perpetual and is unaffected by the death, withdrawal, insanity or bankruptcy of its shareholders. This feature is of extreme advantage to a farm business once the original transfer of assets has been completed and payment has been made. From that point, inventories and accounts receivable can be built up without a deemed realization on the death of the operator, if common shares go to sons or daughters or wife.

(c) Right to Contract

The legal function of the corporation's equity as an artificial person with the right to contract in its own name can be of advantage in

dealings in assets and estate planning.

(d) Management

A desirable feature is added to a business where management can be divided from, or exerted in different proportions than ownership. This can be particularly advantageous where a father may wish to give a son either all or part of the future growth, but may wish to retain control of the assets.

(e) Transferability of Shares

The fact that the ownership of a limited company may be bought, sold or subdivided without affecting the corporate existence may be of particular appeal in connection with estate planning. This aspect of incorporation will be dealt with later.

(f) Raising Capital

The investment of funds in a corporation is usually more desirable to an investor, but in connection with farming, the principal prospective investor with whom we are concerned is the Farm Credit Corporation. There are no disadvantages of the corporate form of organization in dealing with Farm Credit Corporation, and in some types of arrangements, there are substantial advantages. These will also be discussed in detail later.

The following is a summary of some points which I feel are particularly in favour of incorporation:

SUCCESSION DUTIES, CAPITAL GAINS, AND GIFT TAXES

(a) The incorporation can be used to freeze the value of the land that will be included in the father's assets in a time of rising prices.

The fact that the increase in land value can be held outside the estate is an important factor. This benefit, through judicious issue of shares, can be passed to the family.

(b) Some capital gain on both land and equipment can be realized during the lifetime of the farmer. This realization will be up to valuation day as of December 31, 1971.

(c) The ease of transferring portions of the business would probably in itself pay for the incorporation. As you are aware, in a partnership or proprietorship, it is difficult to arrange for another party to obtain or change interests in real property. In most cases, these changes are not made because of the difficulty in obtaining proper documentation, and if the changes are made the documentation usually is not proper. One can imagine the documents that would be required in order to transfer land interests to three sons at say 10% each, later to 15% each, and at the same time retain appropriate interests for the farmer and his wife. This is not to mention the costs of re-registration of documents, land transfer taxes, legal costs and the like that would be incurred.

(d) In the estate planning work I have been involved in with farmers, I have invariably found that where more than one family member is involved, land titles and other titles are not registered as they should be, or as the individuals think they are. Incorporation serves to rectify this situation once and for all.

(e) I have frequently found that during the course of a family operation individuals have granted to relatives partnership interests. These arrangements are often verbal, or supported by legal agreements drawn without recognition of possible tax problems. As a result, gifts may have taken place, or may be deemed to have taken place, with adverse tax consequences. The incorporation of the business will usually disclose these situations and permit their rectification.

SECURITY AND FINANCING

(1) The corporation can give a mortgage or demand note back to the vendor (the predecessor proprietor) on the land, buildings and equipment. As a result, the owner can have security comparable to that available to him as a proprietor.

(2) Financing from Farm Credit Corporation will be no more difficult to obtain as a corporation and may, in fact, be easier in that if three or more shareholders are active in the corporation, it may qualify for the maximum loan of $100,000.

(3) Financing is available from Farm Credit Corporation in order to finance the purchase of the shares of one shareholder by another. This financing is not as conveniently obtainable for the transfer of partnership interests.

INCOME TAXES

(a) The normal advantage enjoyed by the farmer may also be enjoyed by the farm corporation, which is the cash method of reporting income.

(b) If both the farmer and the corporation remain on a cash basis, the tax cost of realizing inventory can be reduced by spreading the payment over several years.

(c) Income may be split by the payment of a salary to the farm wife and other members of the family if they are active in the business.

(d) The farmer is able to maintain his Canada Pension Plan benefits in spite of farm losses that may occur in some years.

(e) The use of a corporation permits the farm wife to qualify for Canada Pension Plan Benefits.

(f) 7% rebate on payable corporate taxes announced recently by Mr. Benson's amended white paper will make the 25% a 23.55% effective corporation tax from profit in farm business in 1972.

(g) Ontario Provincial Tax Credit of 5% of value of eligible machinery purchased by corporation in fiscal year April 26, 1971 to April, 1973, can be deducted from any Ontario Provincial Corporation tax payable up to March 31, 1974.

(h) Under Bill 259C, the small business incentive, a Canadian controlled private corporation pays a 25% tax on the first $50,000 annual profit, up to a total accumulated taxable income of $400,000. The term "business income" means the net income from carrying on an active farm business (not investment income).

The principal objection is that if the principal residence and one acre of land are part of the farm corporation, you would then loose the exemption on the house re capital gains.

If a farm corporation is borrowing from Farm Credit Corporation, the principal residence must be part of the farm corporation.

If a farmer has enough net assets to provide adequate income for his wife and family in event of death and enough for his own retirement, has son or sons involved in farm operation or wanting to get involved. I feel there is no alternative to incorporating the farm business. If father incorporates, setting up a proper share structure, in the event of death or sale of his assets, the following taxes will not be payable:

(a) Accrued Income Tax liability

(b) Income tax on percentage of quota valuation

(c) Income tax on recapture of machinery, equipment, and buildings on diminishing returns

(d) Capital gains tax

(e) Reduction of Succession Duties

HOW TO REQUEST FARM CREDIT

Gary Hutchison, University of Guelph

THE FACTS OF LIFE

- Chartered banks couldn't give a damn about farm business.
- 99% of bank personnel know nothing about farming.
- Likewise 99% of the farmers know nothing about banks,
- and only a very small percentage of farmers really understand what good financial information is all about.
- Consequently bankers are very conservative because they don't know what you are doing - they are receiving very poor information.
- However, most farmers are receiving sufficient credit to operate their units. Mainly because the farming industry as a whole has an excellent repayment record.
- Credit problems have been at a minimum because the industry has been dominated by older, high-equity farmers with adequate security to satisfy even the most conservative banker.
- Banks proclaim to be the institutions capitalizing agriculture and yet they only account for 8.6% of the total capital on farms.

- There are many reasons and some good reasons why farmers use finance companies rather than conventional lenders.
- There are also many good reasons why vertical integration is a logical way of capitalizing a part of agriculture.
- Canfarm cannot solve all your financial management problems.
- Canfarm cannot provide you with good income tax management information.
- However, Canfarm can provide a good income and expense record.
- Out of a study of 1,000 Ontario Farms only 84% used chartered banks and yet 97% used credit.
- 400 or 40% used finance companies and for every dollar borrowed by this group from the bank, 56 cents was borrowed from the finance companies.
- 1/3 of all the farms used more than 5 sources of credit.
- whereas only 5% of all the credit used was at high interest rates, 31% of all machinery credit was at high interest.

- 320 farmers used high interest sources for 58% of their machinery credit.
- Banks only accounted for 15% of machinery capital.
- The difference between high and low interest rates accounted for 10 - 15% of the net income of these farms.
- This means 2 extra cows, 10 steers or 60 feeder pigs were kept just to cover the extra cost of this high interest credit.

THOSE ARE THE FACTS - HERE IS THE SITUATION!!

The chartered banks can be criticised for their lack of interest in farm lending. However, it is partially due to the attitude of farmers and farm organizations. Head office staff of chartered banks have admitted they are not interested in farm lending. The potential of placing 3 or 30 million dollars in downtown Toronto at ¼ percent above costs is much more economical than trying to "squeeze" information out of 10,000 "production oriented" farmers.

Although the chartered banks are indifferent to farm lending, the individual branches may be very keen on it because farm lending may represent a major portion of their business. The chartered banks also require the deposits of rural people and there is always the matter of public relations and the bank act review every 10 years by parliament.

Because of the complex nature of agricultural lending, it becomes increasingly important that farmers provide information in greater detail than ever before. Bankers cannot be expected to be experts on a dynamic industry such as agriculture and even the better "farm bankers" cannot conceive of what a farmer is doing without accurate information. Perhaps such detailed accounting is distasteful to the farmer, and as a result bankers are reluctant to request the information. The result is a haphazard "maybe and maybe not" lending policy.

Accurate, adequate and current records are essential to any good business regardless of the size and in themselves are primary evidence of good management. It only seems reasonable that a farmer who applies for a loan of $30 - $100,000 should be expected to keep a detailed set of accounts relating to his business operation. How does a farmer presently

rate a hallowed position when the very best commercial customer brings to the bank three years' balance sheets and a profit and loss statements audited by chartered accountants and thus accurate to the last cent. In the case of the very best farmers, however, the bank manager has to spend considerable time preparing the statements from information obtained by a somewhat lengthy process of questioning and the statements so prepared are frequently found to be incomplete and inaccurate, even where the customer's honesty and integrety are beyond question.

It is very difficult to convince a loaning officer in a downtown Toronto office who has never heard of you, let alone seen you, or your operation, if all the income and expense information he receives is last year's tax notice!

Farmers use finance companies because:

(1) They have flexible repayment terms to match any situation.

(2) They will normally clear within 2 hours with machinery dealer whether or not they will accept the credit paper.

(3) Farmers are making so much money they would just as soon pay the finance company as income tax.

(4) They begrudge the additional time to fill in the forms for low interest credit even though it may mean $200 or $1,000 per hour of effort.

The computer is an excellent way of summarizing income and expense transactions. The year-end statement along with a list of inventory increases or decreases will tell you what the farm was capable of doing last year.

However, if the banker is reviewing your situation on March first, he doesn't want the December 31 Net Worth Statement; he doesn't even want the January 31st statement and yet that is the last print-out available. In a

month you could spend $100,00 loose $20,000 or make $15,000. Bankers want to know where you are TODAY and such information can easily be handled by hand and only by hand.

The computer is a very poor income tax advisor as well. Anyone can fill out income tax returns with a little practice and the computer can help in this regard; however, the big dollars are not made filling out returns, they are made throughout the year. Decision on whether or not to replace machinery and buildings are affected extensively by income tax regulations. Do you have to buy steers or sell steers before the year end? What will it mean to buy fertilizer before the year end if I am expanding next year? These are the questions, this is where the big dollars are and the computer is very limited in these matters. If you are deciding in the early part of December where you stand income and expense wise the last computer information available was closed off on October 31st. Again you could have spent $100,000 or even taken in $200,000. These things must be done by hand and the returns are phenominal for a few hours work.

WELL WHAT CAN BE DONE ABOUT THE DILEMMA?

- and it will be a dilemma for more and more as time goes on because of three major factors: (1) Capital requirements will continue to increase even at an accelerated rate, (2) the ratio of security to loan will be much lower and, (3) Dad won't be able to back you up and co-sign your notes. Your credit requirements will far exceed what he ever dreamed of owning.

LENDER-BORROWER RELATIONSHIP

Such a relationship is very often remote or very strained. This is due mainly to the attitude of the parties often caused by a misunderstanding. Both parties are guilty of creating a poor relationship, but not always in the same cases. The causes are numerous.

What the lender expects from the borrower - This depends to a great extent on the type of lender, the purpose of loan, and the policy of the lender. The finance companies require very little information, but then they cover themselves up in the interest rate. On the other hand, chartered banks with low interest rates and mortgage corporations using public funds deserve to have a complete record of your personal and business affairs. their interest rates cover very little risk, and thus these institutions must protect themselves as much as possible. Put yourself in the lenders shoes and try to evaluate your own loan application. Then you will better understand why lenders ask so many questions.

(1) First, provide a complete and accurate Balance Sheet. Be realistic in your evaluation. Inflated values may add to "book" net worth, but they do nothing to increase debt repayment ability.

If I told you to make sure you had good net worth statements in the hands of your banker you would say what else is new, I am already doing this. My answer to this is that you are not. Once a year you are haphazardly providing some figures that your banker trys to make into a balance sheet. You must submit a balance sheet at least equal to the following (Exhibit A) 3 or 4 times each year plus the supporting schedules on machinery at least once and on livestock and crops each time you give him a net worth statement.

EXHIBIT A

Balance Sheet of Farmer A

January 11, 1972

Assets		Liabilities and Net Worth	
Current:		Current:	
Livestock held for sale	$ 12,400	Accounts Payable	$ 1,700
Grain Corn	2,000	Notes Payable	1,900
Corn Silage	2,100		
Hay	1,200	Intermediate:	
Supplies	2,000	F.I.L.	1,000
Working:		Fixed:	
36 Cows (dairy)	11,625	Mortgage to Farm Credit	10,200
31 heifers	7,050	Mortgage to J.A.Roberts	3,000
Machinery	12,700		
		Total Liabilities	$17,800
Fixed:			
Real estate	61,100	Net Worth	94,375
Total Assets	$112,175	Total Liabilities and Net Worth	$112,175

Crops in the Field - Inventories taken in early summer for the banker may show substantial decreases over ones taken in January and yet the farm has not gone back. Growing crops represent substantial outlays (150 acres of corn may represent an out-of-pocket cost of $6,000). Although there is no guarantee these crops will be harvested it must be assumed, all other things indicating good management, that the crops will be harvested. Crops in the field should be evaluated at cost or market value, whichever is less. Ploughing and fall fertilizer or herbicide applications should be included in the year end inventories at cost.

You must learn to make these out and let the banker transfer them to whatever form he wishes. Make sure the lender has them several days before your review or request for changes.

(2) At least once a year provide your banker with a Net Farm Income Statement. Not a copy of your income tax returns; income tax returns have very little to do with true net farm income unless you are on the accrual method. Why wait to be asked. Why not automatically provide such a statement. It may clear up a lot of questions.

A Net Farm Income Statements includes: INCOME MINUS EXPENSES Plus or minus changes in value of inventory on hand (livestock, machinery, buildings, land, crops and supplies). The resulting figure tells you what this farm with a given combination of land, labour and capital was able to produce under your management. Yes it depends on prices, but at least it is something. If you can subtract living costs from this, the resulting figure is what is left for debt repayment. It may be in the form of inventory, but at least it is security or collateral.

(3) Depending on the level of borrowing, you may be asked for a plan of operation including repayment dates. This is where the forward accounting and cash flow chart could be of help. These statements will show the lender how much income and expenses you expect and when and how it will be used. They can also show a lender when and how much you can repay.

If you are changing your operation you had better have some idea of what it will cost and what it will add to your unit in income. This is old hat to you also, but a lender is not a mind reader and it is surprising how receptive he might be to some facts on paper.

Cash flow, a relatively new term, is nevertheless a significant tool in our bag of financial aids. It is a chart setting out the dates of income and expenses both business and personal and loan repayment. Such a tool is seldom used, but I think it should be. Let's not be concerned about a year in advance; try a 3 or 4 month cash flow. It can save you big dollars in interest and also give you a better idea of how much you need to borrow, when it may be needed, and an idea of how much income will be available to offset the expenses.

The older well-established farmer with a good credit rating will not likely have to provide a lot of detail and maybe just a net worth statement. However, even some of these people are finding they could use more credit, but the banker is reluctant to extend more because they have not really shown him how and why they need it. Many farmers today could use more credit profitably if it was used for the right purposes and geared to a realistic repayment program. The only way you are going to obtain this credit is to provide the lender with the type of information that can justify more credit. Remember he has to "sell" your request for credit to his superiors and what do they know about your situation beyond what you tell them. Very few bank loans over $15,000 are made without the approval of a loan reviewer in a central office.

(4) Keep your word - use borrowed funds for the purposes outlined to the lender. If circumstances require a change in plans, talk it over with the lender. Be prompt on due dates. At least show up at the bank even if you cannot meet your commitment.

(5) Consolidate your financing - I have seen farmers with as many as twenty to thirty creditors listed on a statement of liabilities. This can be nothing but a nightmare regardless of how you look at it. You cannot expect a banker to play ball with you if you have one or two other banks, four finance companies and ten other creditors trying for a "piece" of your milk cheque. If you have a mortgage, F.I.L.'s and demand or time notes with a bank and a little revolving credit with one or two suppliers, this is sufficient. If your reaction to this is "I can't get enough credit from the banker to do it this way", did you ever think that maybe it is your fault. On the other hand it may be the banker who does not understand your operation despite your extensive efforts to supply him with a complete picture. You may have to contact head office or pound the desk.

If you cannot obtain "sufficient" credit it could be the banker knows you have sufficient now, or you have not presented a complete and clear picture of your operation. Split financing may appear to give you more credit than you could get from one lender, but in the long run it is a constant nuisance and no better than building up a good relationship with a banker.

<u>What can you expect from the lender</u> - You can expect him to be more than just a source of credit. You should be able to discuss your plans with him and expect some sound advice; not necessarily on how you should run your farm, but sound business advice about your farm. You can expect a lender to know something about farming; again not all the details, but at least a realistic perspective of your operation. Otherwise he is no good to you and chances are you cannot obtain the credit you need and deserve.

You can expect a lender to be abreast of the trends in the economy, and in particular, the agricultural economy. If the outlook for beef is very good, you expect a lender to be aware of it. If marketing board rights in tobacco are decreased 15%, the lender should be aware of this and change his lending program accordingly.

Finally you can expect a lender to be well informed about his own business finance. He must be realistic in his lending and his repayment terms. Bankers must be prepared to extend large sums of credit to worthy farmers on repayment terms in line with the returns from farming. Too many bankers are not exercising their individual bank policy to its fullest (not loaning for purpose which they could, or shortening repayment periods more than necessary). You can also expect a visit from your banker. There is nothing more revealing about a farm operation than a visit to the farm. If you are not satisfied with your credit program, demand a visit. If this does not work ask the banker to contact the agricultural specialist in his central office.

Summary and Conclusion - "Split financing" that is, a truck financed here, a car there, a freezer through the finance company, cows with the local drover; no wonder financial institutions are leery of some borrowers. Each creditor must look out for himself under these conditions. Until borrowers are prepared to do 90% of their short and intermediate-term financing with one or two lenders, they cannot expect a sound realistic lending program from any one lender.

Although we condemn farmers because they often have too many creditors, it is not always the farmers' fault. Because of the structure of our financial institutions it is impossible to obtain all your credit needs in one, or even

two places. The mortgage companies give you long-term credit, but not the short and intermediate-term credit. The banks will give you short and intermediate-term credit, but no long-term. It becomes a matter of "one hand not knowing what the other hand is doing." There is a real need for "packaged credit" to cover the entire farm operation. It can be provided best by financing the farm as a single unit of operation, and not by breaking it down into short, intermediate, and long-term segments. Some farms are financed this way today in Ontario by the banks with blanket mortgages on the real estate. It is high time both the federal and provincial governments and banks recognized such a method as common place rather than the exception. They desperately need encouragement from you, the farmers. The present system is antiquated and costly.

SUPPORTING SCHEDULE

Livestock Inventory

Held for Sale

Description	Market Date	Total Value
200 feeder pigs @ $26	2 - 6 weeks	$ 5,200
36 dairy steers @ $200	5 months	7,200
Total livestock held for sale		$12,400

Held for Breeding

23 cows @ $350	$ 8,050
13 cows @ $275	3,575
13 bred heifers @ $300	3,900
18 open heifers @ $175	3,150
Total breeding livestock	$18,675

Crops

Corn for sale 1,700 Bu. @ $1.18	$ 2,000
Corn silage 300 T. @ $ 7	2,100
Hay 4,000 bales @ 30¢	1,200
Total Crops	$ 5,300

Supplies

Fall application of potash	$ 2,000

Machinery and Equipment

Auto 1969, cost $2,600 - adequate	$ 1,500
Tractor # 1 1966, cost $4,500 - adequate	2,000
Tractor # 2 1963, cost $3,500 - adequate	1,000
Forage Harvester (pick-up and head) 1969, $3,500 - good	2,500
Two self-unloading wagons, cost $3,000 - adequate	2,000
Manure spreader - adequate	400
Tillage equipment - adequate	2,700
Baler - adequate	400
Truck 1963 - must be replaced	200
Total Machinery	$12,700

Real Estate

80 acres @ $180	$14,400
90 acres @ $230	20,700
30 acres @ $100	3,000
House - adequate	6,000
Barn - adequate	7,000
Hog barn - new	10,000
Total Real Estate	$61,100

Total Farm Inventory	$112,175

LIABILITIES:

	Present Debt
- Mortgage to the Farm Credit Corporation taken out in June 1968 - \$11,000 for 29 years @ 8¾% Payable June 1st, \$1,066 principal interest and life insurance.	\$10,200
- Second mortgage to father, June 1966, \$4,000, interest @ 6% - no definite repayment schedule. Interest due December 31st.	3,000
- Farm Improvement Loan - Taken out September 1969 for \$1,300, P. & I. Payment due September 30th - \$234.00.	1,000
- Bank demand note operating; 7½% payable or renewable every 6 months. April and September 15th.	600
- Notes payable to father on demand; June 1966 - \$1,200; 6% interest; no definite repayment.	1,000
- Notes payable to others; June 1970 - \$600 from dealer on machinery due and payable.	300
Accounts Payable	
- Mak-Mor Feed Mill - revolving account.	1,230
- Ready-Mix Plant Account for paved barnyard completed October 14th, due and payable.	400
- Wil-Run Machinery Company - revolving repair account	70
TOTAL LIABILITIES	\$17,800

CREDIT FOR REFINANCING

M. H. Albers
Farm Credit Corporation
Chatham

Legal Costs of Farm Credit Act Mortgage Loans

The F.C.C. is a Federal Government loaning agency which administers the Farm Credit Act and the Farm Syndicates Credit Act. Under the F.C.A. our main purpose is long-term mortgage financing. Since we can only make loans on the basis of a first mortgage on land security, we should not overlook the legal costs required for such loans. These costs amount to a minimum of 1% of the loan amount up to $20,000 and ½ of 1% on that amount over $20,000. The disbursement fee is approximately $35. Therefore legal costs for a $40,000. loan would total a minimum of $335.

Considerations for Refinancing Loans

When a loan request is made for refinancing obligations, we have to consider:

(1) The probable appraised value of the property offered as security and the amount of loan that may be possible.

(2) The type of debt which is to be refinanced.

i.e. - long, intermediate or short-term.

(3) The reasons for requesting the refinancing loan.

(4) The record of production and financial management of the applicant.

(5) The applicant's repayment capacity based on a realistic projection of net farm income.

(6) Will the loan offer a permanent solution to the problem?

It is a good farm business practice to have long-term financing for long-term obligations. Land mortgages, permanent improvements to property and purchase of basic herd livestock should be financed on a long-term basis at the most

favourable interest rates available. Refinancing these obligations presents no problem to the Corporation if other factors are favourable.

Applications to refinance intermediate term obligations, such as those incurred for equipment purchases, must be examined more closely. Sometimes purchases were made of equipment which is excessively large for the size of the farm operation. Refinancing such debts is not a permanent solution to the problem. On the other hand, if an extensive farm expansion program has been undertaken which necessitated a considerable outlay in larger equipment, there may be justification for a refinancing program. Such a program would spread the debt over a longer period of time and leave more operating income for current operating expenses. However, the repayment period should not normally exceed 10 - 15 years.

Generally speaking, the Corporation will not refinance short-term obligations such as operating debt carry-overs or current operating debts. Such loans only tend to decrease the farmer's equity in his property and would only relieve the financial pressures temporarily. However, a loan might be considered where extenuating circumstances has resulted in temporary loss of farm income. All such applications must be considered on their own merits. If a loan is granted, the repayment period would be reduced but kept in line with the applicant's repayment capacity.

FARM SYNDICATES CREDIT ACT LOANS

No provision exists under this Act to refinance equipment or grain storage debts. It is possible, however, to purchase used equipment or to purchase equipment or grain storage facilities from a syndicate member for the use of all syndicate members.

To Determine Need for Refinancing

Every farmer should annually test the financial solvency of his farm business to determine the possible need for refinancing debts. This is normally done when the year-end inventory is taken. The old farm management tools of Net Capital Ratio, Working Ratio and Current Ratio should be used. It should be remembered that you can have a good annual net farm income and a high net worth and still be in financial difficulty. In the long run the financial solvency of the farm business also determines your repayment capacity.

Good farm records are needed to analyze any farm operation and good records will also help you get the credit you need. Our Credit Advisors at Lambeth, Petrolia, Essex and in Chatham will be glad to discuss your individual credit needs. Drop in and have a friendly chat with them.

LANDSCAPING AROUND THE HOME

R. H. Brown
R.C.A.T., Ridgetown, Ontario

Landscaping is the arrangement of soil, trees, lawns, paving or walks, shrubs, ground covers and other components of our surroundings to make them pleasing to look at and pleasant to live in. Benefits derived from a well landscaped surrounding include a protection of one's investment in a home or even an increase in the value of the property. An outdoor living area is also created for use during the warm summer months. Well landscaped surroundings reflect pride of home ownership as well as a person's character and habits.

Softening Architectural Lines

The main purpose of landscaping our home is to blend the structural lines of the buildings with the surrounding property and plant material. The vertical and horizontal lines of architecture become monotonous to the eye creating a cold unfriendly appearance. The irregular lines of nature's plants counteract the straight lines of buildings thus softening their harsh effect.

The use of plants along the foundation breaks the horizontal line of architecture. Spreading or low growing plants of various shapes, height and texture are most frequently employed for this purpose. Taller growing plant material is used at the corners of the home to offset the vertical lines of the outside walls. Trees behind and in front of the home will break the roof line.

Framing the Picture

Trees create a setting for the home. If the home and its surroundings are considered a picture, then trees provide an excellent frame for this painting. Trees planted to the rear of the house not only provide shade, but

also form a background for the home focusing our view on it and the immediate surroundings.

Trees planted in front of the home will form a false ceiling and create the top of the frame particularily if the lower branches are removed to allow seeing the home from the front.

Plant material along the sides of the property will function as the sides of the frame to the picture and also give the impression of more width to an otherwise narrow property.

Canvas for the Painting

The quality of the canvas will affect the appeal of the end product of a well carried out landscape. The canvas of our home surroundings is most frequently the lawn. The soil preparation, grading, fertilizing and type of soil, the choice of seed, for a new lawn, the establishment of a new lawn and its care after establishment will determine the excellence of this canvas. Proper mowing, adequate fertilizer application and weed control are important aspects of maintaining a well established lawn.

Ground covers may be substituted for lawns in appropriate places such as around trees, on sloping areas and around shrubs.

Harmony of Design

The materials used for landscaping should be secondary to an attractive home. They should create a setting for the home not compete with the home for eye appeal. The plant material in the vicinity of the building unifies it with its surroundings. The neutral green colour of most plants assists in this harmony necessary to an attractive landscape. There is room for contrast as well in the colour, texture and shape of plants used. Contrast will be harmonious to the design if used in the right proportion and in the proper places. Focal points such as entrances allow the use of a specimen planting.

Maintenance of the Landscape

The initial efforts required to landscape a home are costly and time consuming. The appearance of the surroundings will then depend on the upkeep of it. Neatness around the home is the difference between an attractive and an unsightly surrounding. Keeping the lawn edged, beds of flowers or shrubs free of weeds, plant material pruned, areas fertilized for optimum growth, board fences and other frame work painted and repaired, and numerous other items contribute to a well maintained property.

In this regard it is worthwhile noting that a simple design will keep maintenance to a minimum. One common mistake is overplanting. A new planting of comparatively small immature plants looks more impressive if overplanted. The crowding, unattractiveness and extra pruning required as they mature is evidence of what should not be done in this regard.

Lasting Impressions

It is to our benefit to have a pleasant attractive home surroundings. We consciously or subconsciously notice well landscaped and well maintained home grounds. It follows that we associate the appearance of these surroundings with the habits, both social and working, of the the inhabitants of the home. The initial cost of beautifying a home surroundings may be expensive and the cost and effort of maintenance demanding, but the dividends will prove their worth. It is this lasting impression that we must strive to create and conserve, for it influences to such a great extent the environment we work and live in.

HOW NOT TO BE GYPPED

A. R. Walker
Registrar
Consumer Protection Bureau
Department of Financial and Commercial Affairs

Thank you for this kind invitation to be with you today. While it may be nearly a month too late for some of this audience to hear a talk on credit, I hope what I have to say will be useful for those who still have a little money left after Christmas. And, of course, there is always next year. If any of you may have followed the advice of a certain merchant, my remarks will still be timely, for he advertised in his store window, "Keep Christmas with you all year - use our budget payment plan".

I've come to talk to you about deception ... how we can be deceived and how we can deceive ourselves in today's market-place. I've come to talk about both the use and abuse of Credit. And I've come to talk about the Consumer Protection Division of the Department of Financial and Commercial Affairs and what we, as a department, are doing or can do for Ontario residents.

But first, when preparing my remarks for today, I came across two items which help point up the fact that deception and unethical practices are not something unique to today's market-place. They've been with us for a long time. Since the first item deals with agriculture and the second with what we might call in a figurative sense, "husbandry", I feel they are quite appropriate to share with you.

"A most shameful imposition is carried on in our markets today by a set of butter sellers. These imposters go about the country buying up good butter from the farmers at a low rate. When they have collected a quantity, they come to town and mix it with hog's lard and tallow and retail it in rolls." Shame.

That article appeared in a New York newspaper in 1786, 185 years ago.

I would assume that the consumers of those days were up in arms over this deception and were crying for protection against such abuses. I will hazard a guess that it wasn't too long after that a law was passed requiring butter sellers in the open market to meet certain standards. The case, of course, points out the fact that the ethical business dealers in butter had to suffer because of the few imposters. The same is true today. The majority suffer because of the minority.

The second item involves a much more serious case and it shows how our attitudes towards what we might call false advertising have changes over the years.

In 1770, a law was passed in England against obtaining husbands under false pretenses.

The law stated plainly and strongly "that all women of whatever age, rank, profession or degree who shall, after this act, impose upon or seduce or betray into matrimony any of his Majesty's male subjects by virtue of scents, paints, cosmetic washes, artificialities, false hairs, Spanish wool, iron stays or upholstered hips or high heeled shoes, shall incur the penalty of the laws now in force against witchcraft and like misdemeanors, and that marriage under such circumstances shall be null and void."

I've never talked to such a large audience of law-breakers!

I'm afraid our department has no such protection for the male consumer today. Noting the reference to 'upholstered hips', the closest we would come is "The Upholstered and Stuffed Articles Act" passed in 1968. But you'll be happy to know that we have not had one recorded incident of having to burn a witch since the department was formed.

Witchcraft may be gone, but forms of that art are still practised by some flimflam or fringe operators who plague our marketplace today. They're still lurking behind doorways, casting spells and offering magic potions. And they're still finding willing victims who want to believe them.

One big-selling magic potion today is Credit, and its ready availability. It has become an accepted and expected way of life and while it works magically for some, it is a bad potion for others.

In many ways it is like a medicine. You're better off if you never have to take it but, taken in the right measures, it can be helpful when needed. The problem arises when you take an overdose or when you begin to rely on the medicine as the cure all.

Yes, Credit is good but it can be evil if it is misused. We must always recognize that Credit is a privilege not a right, and that there are serious responsibilities accompanying that privilege -- the faith and trust that is placed in us by the credit granter.

In the past, the consumer was faced with a relatively limited choice of goods and services, so C-edit was not a problem.

Today things are different, advances in technology and mass marketing present the consumer with an almost infinite variety of goods and services. The result is a degree of confusion and therefore, the consumer must be more aware and more wary. The consumer must be more thoughtful and more knowledge--able than ever before.

In the Technical-Servicing-Repair field especially, the consumer is almost helpless as far as making absolutely sure that what he is getting is worth the money he is spending. The multitude of appliances and gadgets has led to a mushroom growth of Servicing-Repair Organizations and an accompanying dilution of trade skills.

In this crucial area, the modern marketplace has proved to be a fertile ground for unscrupulous operators whose objective is to confound, confuse and cheat the unwary consumer.

The reaction to all of this -- by consumers, and by government -- has been frustration, annoyance and outrage. From the private sector, various

consumer groups and organizations have emerged, striving to protect and enunciate the interest and the rights of the consumer in the marketplace. In large measure, these organizations have done a good job, and must be commended for their continuing effort.

At the same time, government has tightened its regulations, intensified its efforts to ensure a marketplace environment that is healthy and spirited for the consumer and the responsible businessman alike.

To that end, I might mention that eleven statutes are administered through the Consumer Protection Division of our department. For a few moments I should like to review with you some of the salient points of the Consumer Protection Act and the Consumer Protection Bureau Act with which I am most familiar.

THE CONSUMER PROTECTION ACT

The Consumer Protection Act is an important instrument in dealing with the credit problem. It provides for full credit disclosure whenever the purchase of goods is financed, and in that respect is similar to laws in most of the Provinces of Canada.

By credit disclosure, we mean the contract must clearly show the amount the purchaser is paying over and above the price of the goods.

Where goods or services exceeding $50 value are sold and payment or delivery is postponed, a signed contract must be completed by the seller and by the purchaser. This contract must show, among other things, the following information:

-- The name and address of the seller and buyer
-- A description of the goods or services sufficient to identify and describe them clearly
-- The itemized price of the goods or services, and a detailed statement of the terms of payment

-- Where Credit is extended, a statement of the cost of borrowing is required. This means the Finance Charge must be shown in dollars and cents, and a "TRUE" annual percentage rate.

-- Also, any warranty or guarantee applying to the goods or services, where there is no warranty or guarantee, a statement to this effect must be included.

Where a contract fails to spell out all of this information, or where a contract, signed by both the buyer and the seller, is not received by the buyer, the contract is not binding on the buyer. This is an important provision for the consumer.

In Charge Account transactions of the variable or revolving type, such as used in large department stores and oil companies, the Consumer Protection Act applies as well.

The Act provides that the consumer must be given full details at the start of the Credit Plan. Similar statements must be provided the consumer each month, covering all details of charges and payments as well as the opening and closing balances.

The Act also provides that the seller cannot enforce a contract if it creates a lien on any goods other than those which are actually involved in the sale.

Further, this legislation states that where two-thirds or more of the purchase price of the goods has been paid by the buyer, there can be no repossession without first obtaining a court order.

In the field of credit promotion, the Act also regulates credit advertising, and can halt other advertising which is considered to be false or misleading or deceptive.

These are important provisions related directly to the question of consumer credit. The Consumer Protection Act also includes forms of

protection which have a bearing on the circumstances affecting the consumer's decision to "Charge It".

ITINERANT SALES

Itinerant, or door-to-door selling is watched closely by the Act. It is a kind of buyer/seller relationship that embodies numerous pitfalls for the consumer.

The Act provides for the compulsory registration and bonding of all door-to-door or itinerant sellers in Ontario; A governmental right to inspect a sales company's books and records if necessary; A "Cooling-off" period, which allows the consumer to disengage himself from a contract he has decided is not in his own best interests.

The Cooling-off period works this way:

The consumer is visited in his home by a salesman and signs an agreement to purchase. Later he decides he doesn't want to go through with it.

By sending a letter to the company within two working days of the sale, using either registered mail or by delivering it himself, the consumer can negate the sale.

The two days is the "Cooling-off" period, and offers protection to consumers who might have entered an agreement under duress.

I might add that upon cancellation of the contract within the two-day "Cooling-off" period, the company must return any deposit the consumer may have made on the item involved, and must also take back any goods left at the consumer's home.

Another provision of the Consumer Protection Act that I want to mention today relates to the mailing of unsolicited goods or credit cards.

The law doesn't outlaw this practice, but it impresses upon both business and the consumer the wisdom of exercising good judgment and restraint.

According to the Act, the consumer faces absolutely no obligation upon receiving unsolicited credit cards or unsolicited goods in the mail. He may consider goods received under such circumstances "gifts" and he can ignore or throw the credit card away after mutilating it without obligation. The only way he becomes obligated to the credit card is if he uses it, or agrees in writing to the accompanying terms of credit.

Prior to this provision, which emerged as an amendment to the Act last year, consumers often found themselves facing stated or inferred obligations linked to unsolicited goods or credit cards that suddenly appeared in their mail box.

There no longer need be any doubt.

CONSUMER PROTECTION BUREAU

And now a few words about the bureau itself.

In the short time that the bureau has been in operation, a large volume of complaints has been received and investigated, many of which certainly do not fall within any aspects of the legislation. Every attempt is made to obtain redress for the consumer after the true facts are obtained on both sides of the case, and if it is duly determined that the complaint is justified.

Most problems relate to home solicitation or door-to-door selling, of vacuum cleaners, magazines and books, food and freezer plans, carpet and broadloom, aluminum siding, home-driveway paving and other home improvements. Other complaints reach us about the practices of certain dance studios or social clubs, furniture, appliances, et cetera. This year until November 30th, we processed 3,923 complaints and answered 27,893 telephone enquiries.

Briefly I'll mention two types of complaints recently directed to our bureau.

"Last summer and early fall farmers throughout Southern Ontario were approached by some travelling salesmen to have aerial photos taken of their farms. Contracts were entered into and a deposit of about $20 was required. The operators of that scheme have disappeared and are now being sought by the police. Presumably these persons are living quite well on the money which so many trusting citizens gave them. No one apparently questioned the authenticity of that operation beforehand".

The other case is even more serious, as it concerns a widow with three children to support. Although she is steadily employed, and has some supplementary income by way of alimony payments she is in debt to the extent of $6800 to four department stores, two finance companies, a credit union and two other creditors. Fortunately, all these creditors have agreed to co-operate by accepting their pro-rata share of $150 which is being deducted monthly from her salary. On a good portion of these debts she is still being charged 12% interest but that is much better than 18% to 21% she was formerly paying. It will be a long time before she can fully recover but a start has been made. Credit was abused and both lenders and sellers must accept part of the blame for her plight.

Most complaints are resolved by "moral suasion", but in some cases we refer the complainant to a lawyer as we are not set up to handle the complainant's case in court. Where an itinerant seller proves to be a bad actor, and fails to co-operate, I, as the Registrar, may recommend the seller's registration be suspended or cancelled. The decision of the Registrar, is, of course, subject to a statutory review and hearing before the Commercial Registration Appeal Tribunal, whose decision in turn, may be appealed to the Court of Appeal.

The Legislation also provides that where a person contravenes the provisions of the Act or the Regulations, a charge may be laid and, upon conviction, that person is liable to a fine of up to $2,000 or to imprisonment for a term of not more than one year, or to both. Where a corporation is convicted of an offence, the maximum penalty is $25,000.

The bureau maintains close liaison with, and fully co-operates with, all our own departments, as well as our counterparts in other provinces and at the Federal Government level. Our sole aim is to ensure protection to the consumer, no matter through what source this may be obtainable, and I may tell you that results achieved have been most gratifying.

In approaching the problems of consumer credit, one major tool, as I mentioned earlier, is the "Principle of Full Disclosure". This means, quite simply, "Getting All of the Facts on the Table". This is the surest weapon against unethical behaviour in the marketplace, and the firmest approach to adequate and sound consumer protection programs.

Many of our consumer Laws are designed to satisfy this principle. We want to make sure the consumer can make a decision that is based on fact; that he can enter a contract in full knowledge of his obligations; that he can make a purchase fully aware of his obligations; that he can make a purchase fully aware of what the item is costing him now, and later, if credit is involved.

The Consumer Protection Bureau, and the department as a whole, is not out to "get" business. We are not trying to disrupt the natural processes of business enterprise. Rather, we are working to help make the system work fairly, and in a spirited fashion. Full and true disclosure is vital to this objective.

We see the protection of the consumer's rights in the marketplace as a two-way street; responsibility rests with the consumer just as much as it does with business and industry.

After all, how far can Government go in dictating our actions by law? - or if you will, hold our hand. Well, sometimes it reaches the humourous extreme, such as a law which I hear exists in Gary, Indiana, which makes it illegal to ride a streetcar or attend a theatre within four hours of eating garlic. Massachusetts apparently has a law which makes it illegal to eat peanuts in church. And if that isn't enough, there's also a law against using tomatoes in clam chowder. Basically, our approach to consumer protection involves both legislation and concept of consumer education and awareness.

The scope of the problem and the magnitude of the challenge facing us are reflected in statistics, which show that consumer credit in Canada has grown from $835 million at the end of 1948, to nearly $11 billion today - a thirteenfold growth.

This means, quite simply, that Canadians are the second largest users of consumer credit in the free world. A pretty imposing fact of life.

Now multi-million and billion dollar figures have very little meaning to us today. So let's look at it another way. In one dollar bills, stacked one on top of another, $11 billion would make a stack 800 miles high. In one dollar bills laid end-to-end, $11 billion would stretch more than one million miles -- enough to circle the earth about 50 times or reach the moon five times.

Credit is a vital matter today and we must all understand the basic tenets of a successful approach to the problem of credit abuse. To this end, I have prepared for you today what I call the "Credit Alphabet". Now, Credit is never as easy as ABC. But if you can put all the letters together, you can spell success.

A is for the Age of Accountability. Earlier this year, the Ontario Government lowered the age of majority with regard to drinking, voting and the signing of contracts. Now an 18-year-old is old enough to go into debt all by himself without an adult's co-signature. When you stop and think about it, this poses a bigger worry than giving him the right to enter bars or elect politicians. Eighteen-year-olds are eager consumers with very little ready cash and a big future. Only time will tell how well they handle this new responsibility.

B is for Borrowing. To paraphrase a finance company's slogan "Never Borrow Money Heedlessly." Be realistic and never borrow to the fullest extent of your credit limit. Plan ahead and stick to your plan.

C is for Credit Cards. We seem to be heading towards a cashless society and credit cards are proliferating at a tremendous rate. The wise card user will always try to repay the month's charges before the interest charges are applied, usually up to 30 days. Again, a reminder, that an unsolicited credit card received through the mail creates no obligation unless it is used by you. If you don't want it, cut it up or better mutilate it and send it back.

D is for Debt, or even, over-debtedness. Know your limits, remember, when they say "Pay Later" - Baby, you better believe it.

E is for Economy. Economy or thrift is always a good thing to practice. Any budget can properly be trimmed. Look for the non-fixed items such as entertainment, food, car expense, holidays.

F is for Free and G is for Gullible. Nothing is for free. Don't be gullible enough to think it is.

H is for Help. Remember there is always help for the person who seeks it. Ask your bank manager, your accountant, your lawyer, the Better Business Bureau, or, of course, the Department of Financial and Commercial Affairs. Also many centres now offer specialized financial counselling services.

_I_ is for _Interest Rate Disclosure_, one of the requirements of the Consumer Protection Act. Always be sure of the rate you are paying. It is clearly shown on your contract. _I_ is also for _Investigate_ and do "_Investigate Before You Invest_".

_J_, _K_, _L_ - Consumer Protection _Laws_ provide _Justice_ for all consumers. _Knowledge_ of your rights is essential. The Department of Financial and Commercial Affairs has undertaken a broad educational program through pamphlets, brochures, speeches and other media to inform citizens.

_M_ is for _Money Management_. If people would only budget ... and stick to it! But we're lured away. You must set your plan, try it out, change it, but then you must stick to your final plan. You'll make mistakes, but remember that even perfect people buy pencils with erasers. It's when you use the eraser before the pencil that you have to begin to worry.

_N_ is for _Never_. Never sign a contract until you are sure. Never use your maximum credit capacity except in a real emergency. Never sign a contract in blank or with blank spaces. Never, never, never.......

_O_ is for _Over-Indebtedness_. Don't risk it. Know what you can handle and stay well within your boundaries. And be pessimistic about credit. Assume the worst and you'll be prepared for most emergencies.

_P_ is for _Price_. Shop around. But remember that the best price is not always the best bargain. Also remember that the purchase price involves the total obligation including finance charges.

_Q_ is for _Question_. Question the seller. Have everything explained before you buy. The old handshake is fine between neighbours, but not with a man you have never seen before and may never see again. Get the facts in writing and be sure before you sign.

_R_ is for _Repossession_. If two-thirds and more of the purchase price, including carrying charges, has been paid, the goods cannot be repossessed or resold without permission of a county or district court judge.

S is for Savings. Before you start to use your Credit, do some serious thinking about using savings for at least part of the down payment. Remember you must have long range goals to keep from being frustrated by short range failures. Try to save at least five per cent of your income.

T is for Today. Today is the first day of the rest of your life. No matter how burdened you may be, there is always a way out ... one step at a time.

U is for that Unknown Factor. No one can ever be certain what emergency will unexpectedly arise. It's best to have some margin of safety to manoeuvre.

V is for Value. Nothing is a bargain unless you really need the article. Shop wisely and discriminately for quality merchandise.

W - We'll make "W" an audience participation letter. I'll give you some key words and you can make up your own warning. Let's start with want, or waste, or wish. Willpower is a good word. And how about whole-sale. Or maybe just wrong. That will also give me a little time to think about the next three letters.

X - Well, of course, X marks the spot where you sign.

Y - Y is You. You have a responsibility. Y is also "Yoke". The yoke that you put around your neck with the burden of overdebt.

Z - Well, you don't have to be a zealot about Credit, but the wise use, not abuse, of Credit, can put some zest and zing into your life. And when looking for that bargain, don't mistake a diamond for a zircon.

Mark Twain once wrote that "There are two times in a man's life when he should not speculate; when he cannot afford it and when he can".

This message is clearly applicable today. The modern marketplace is no place for the consumer to speculate -- whether he thinks he can afford it, or whether he knows he cannot.

Credit-buying sometimes involves far too much "Speculation" and "Guesswork" on the part of the consumer.

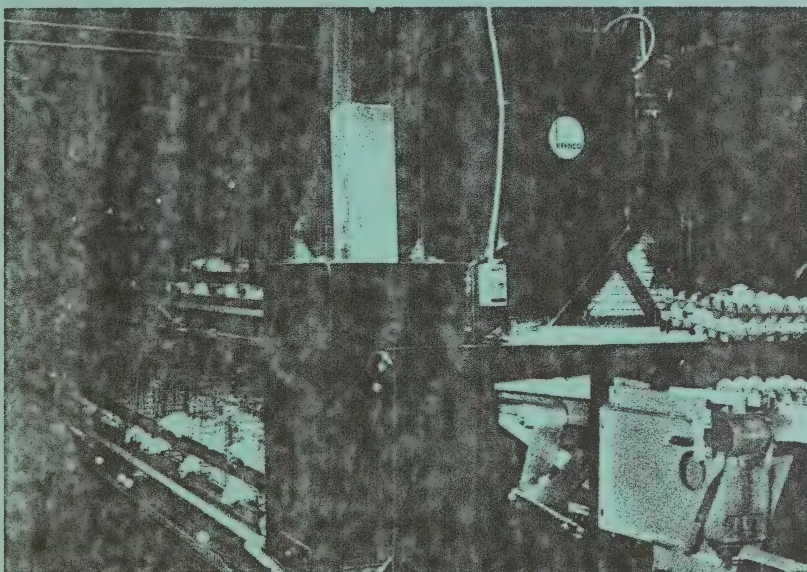
For those who use Credit when they shouldn't it is a treacherous ally. For some people, it is almost an addiction, a new kind of social problem that eats away at peace of mind, family and social relationships and personal security, until there seems no way out.

Don't back yourself into a wall of debt.

- The message - use Credit -- don't abuse it.

SUMMARY

SOUTHWESTERN ONTARIO FARMERS' WEEK
AT
RIDGETOWN COLLEGE OF AGRICULTURAL TECHNOLOGY



POULTRY
Wednesday January 12, 1972

ONTARIO DEPARTMENT OF AGRICULTURE & FOOD
PARLIAMENT BUILDINGS, TORONTO

EVERETT BIGGS/DEPUTY MINISTER HON. WM. A. STEWART/MINISTER

FOREWORD

The Southwestern Ontario Farmers' Week is a result of the deliberations of many individuals beginning in early October. Most segments of the agricultural community of Southwestern Ontario are represented with the emphasis on the farming sector.

The sessions containing discussion on current topics of interest to many people are repeated each day so that as many as possible may participate. A summary of each presentation is contained in this booklet. It is hoped that this information will be of use to each and every farmer interested.

Among the organizations responsible for the planning of the 1972 Farmers' Week are:

Soil and Crop Improvement Associations, Milk Committees and Beef Improvement Associations of the Counties of Essex, Kent, Lambton, Elgin and Middlesex

Kent Vegetable Growers' Association

Essex Vegetable Growers' Association

Ontario Bean Producers' Marketing Board

Ontario Soya-bean Growers' Marketing Board

Ontario Department of Agriculture and Food

Harrow Research Station (Canada Department of Agriculture)

We, at the Ridgetown College of Agricultural Technology, are pleased that the planning committee has seen fit to make use of the facilities available here at the College.

If farmers should want to contact research personnel at the Harrow Research Station or the Ridgetown College of Agricultural Technology, the staffs of both stations are listed with the specific area in which they conduct research.

Harrow Research Station

Canada Department of Agriculture

Department and Personnel	Area of Research
CHEMISTRY AND WEED SCIENCE	
Dr. G .M. Ward	Head of Section Greenhouse vegetable crops. Nutrition, production, biochemistry of tomatoes and cucumbers.
Dr. A.S. Hamill	Effect of herbicides on weed species and weed population shifts, influence of weed competition on crop yields.
Dr. P.B. Marriage	Herbicide physiology and persistence.
Dr. W.J. Saidak	Weeds, weed control, herbicide evaluation and herbicide translocation.
Dr. F.G. von Stryk	Pesticide chemistry. Residue analysis, systemic insecticides, fungicides, herbicides.
CROP SCIENCE	
C.G. Mortimore	Head of Section Corn breeding, stalk rot research, agronomic studies.
L.J. Anderson	Variety testing of corn, soybeans, and cereals.
Dr. J.W. Aylesworth	White bean breeding and production practices.
Dr. B.R. Buttery	Soybean physiology and biochemistry.
Dr. R .I. Buzzell	Soybean breeding and genetics, agronomic studies.
W.A. Scott	Burley tobacco management.
ENTOMOLOGY	
Dr. C.D.F. Miller	Head of Section Cereal and forage crop insects (Cereal leaf beetle - Alfalfa weevil)
Dr. W.M. Elliott	Vegetable insects (peach aphid, *Myzus persicae*) on potatoes.
Dr. W.H. Foott	Field crop and vegetable insects (Corn leaf aphid - Sap beetle)
Dr. R.P. Jacques	Insect pathology. (Cabbage looper - cabbageworm)
Dr. P.W. Johnson	Plant parasitic nematodes. (Root-knot nematode - lesion nematode on greenhouse vegetables)

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Department and Personnel	Area of Research
Entomology - continued	
Dr. R .J. McClanahan	Greenhouse insects. (Two-spotted spider mite - greenhouse whitefly, integrated control)
H.B. Wressell (Chatham)	Field crop and vegetable insects. (Insects on white beans, corn and tomatoes)
HORTICULTURAL AND SOIL SCIENCE	
Dr. J.M. Fulton	Head of Section The water requirements of crops, soil moisture, irrigation, evapotranspiration.
Dr. E .F. Bolton	Soil physics, cropping systems, cultivation, tillage, soil aeration and drainage.
Dr. W.I. Findlay	Soil fertility maintenance, build up and decline; crop fertilizer requirements, and time of application.
Dr. R.E.C. Layne	Tree fruit breeding. Winterhardiness. Disease resistance. Peach rootstocks.
V.W. Nuttall	Vegetable breeding. Genetics. Greenhouse and pickling cucumber breeding.
Dr. H.A. Quamme	Tree fruit breeding. Fireblight resistance of pear. Cold-hardy dwarfing rootstocks for pear.
PLANT PATHOLOGY	
Dr. C.D. McKeen	Head of Section Greenhouse and field vegetable diseases. Verticillium wilt. Evaluation of fungicides on vegetables.
Dr. B.N. Dhanvantari	Tree fruit diseases. Peach canker, bacterial leaf spot of peaches and apricots. Crown gall.
Dr. John Dueck	Bacterial diseases of fruit and vegetable crops. Fireblight of apple and pear. Bacterial spot of pepper
Dr. L.F. Gates	Corn root and stalk rot and other corn diseases. Viruses of cereals and legumes.
Dr. J.H. Haas	White bean and soybean diseases. Bacterial blights, bronzing and root rots.
Dr. R.N. Wensley	Soil microbiology. Fusarium wilt and root rot diseases of melons, asparagus and other vegetable crops.

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Ridgetown College of Agricultural Technology
Ontario Department of Agriculture and Food

Department and Personnel	Area of Research
AGRICULTURAL ENGINEERING	
P.H. Bomford	Head of Department. Corn and Soybean harvest losses. Grain drying systems.
R.E. Clayton	Extension engineer (Kent County) in farm buildings, farm drainage and farm machinery.
M. Sojak	Environmental control (ventilation). Drainage systems (durability of plastic drains and drain maintenance. Specialized machinery.
BIOLOGY AND HORTICULTURE (and weed control)	
R.H. Brown	Head of Department. Evaluation of chemical weed control in corn, burley tobacco, asparagus, red beets, tomatoes and strawberries. Control of Quackgrass and fall panicum.
Dr. B. Bolwyn	Insect and disease control in corn (Northern corn blights, rootworm) white beans (white mold).
J.K. Muehmer	Variety evaluation and production techniques in processing crops (sweet corn, tomatoes, peppers, cucumbers).
J.E. Shaw	Evaluation of chemical weed control in soybeans, white beans, kidney beans, lima beans, cereal grains, alfalfa, cucumbers, potatoes. Control of velvetleaf, Jimsonweed, and Black Nightshade.
CROPS	
A.D. McLaren	Head of Department. Variety evaluation and production techniques in corn and forages.
R.C. Jenkinson	Variety evaluation and production techniques in cereals and winter wheat and spring wheat.
D.A. Littlejohns	Variety evaluation and production techniques in soybeans and white beans.
A.K. Brooks	Extension in Crop Production - Middlesex and Elgin Co.
W.W. Parks	Extension in Crop Production - East Kent and Lambton Counties.

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Department and Personnel	Area of Research
FARM MANAGEMENT AND ECONOMICS	
D. Beattie	Head of Department, Farm management and production economics of livestock.
S.J. Usher	Marketing agricultural products, agricultural policies, economics in swine production.
LIVESTOCK AND POULTRY	
D.G. Luckham	Head of Department. Nutrition and egg production, feeding broiler hatching flocks.
J.E. Core	Beef and Dairy rations. Stored feeding programs including stover silage, silage additives.
A.A. Campbell	Chemical components of feed.
J.R. Morris	Selection of swine breeding stock, herd health. Evaluation of additives (protein supplements, antibiotics.) Feeding of high moisture corn stored with organic acid to finishing hogs.
SOILS	
Dr. C.S. Baldwin	Head of Department. Plastic coated corn and spring wheat, nitrogen in spring wheat and white bean production.
R.W. Johnston	Calcium, magnesium, and micronutrients in field crops (corn, soybeans, white beans, and forages).
C.K. Stevenson	Evaluation of nitrification inhibitiors in the nitrogen fertilization of corn. Soil fertility maintenance, time of application of fertilizers.
VETERINARY SERVICES LABORATORY	
Dr. F.J. Harden	Head of Department. Assistance given in diseases of all classes of livestock.
Dr. R.E. Clugston	Assistance given in diseases of all classes of livestock.
Dr. D.A. Stevenson	Assistance given in diseases of all classes of livestock.
AGRICULTURAL LABORATORY TECHNOLOGY	
Dr. J.H. Brimner	Coordinator of course, chemical components of crops and feeds.
AGRICULTURAL SECRETARY	
R.C. Wagner	Coordinator of course. Farm accounting and agricultural policy.

T A B L E   O F   C O N T E N T S

Poultry Production

NEWCASTLE DISEASE (Yellow)

Dr. D.A. Stevenson,
Veterinary Services Laboratory, R.C.A.T. A1-2

RESEARCH IN PROGRESS AT R.C.A.T. (Blue)

D.G. Luckham,
Livestock and Poultry Division, R.C.A.T. B1-4

GETTING THE MOST FROM YOUR PULLETS (Pink)

Dr. J.D. Summers,
Dept. of Animal and Poultry Science,
University of Guelph.. C1-15

OUTLOOK '72 (Green)

M.S. Mitchell,
Poultry Division,
Canada Department of Agriculture, Ottawa.................. D1-7

NEWCASTLE DISEASE

D.A. Stevenson, D.V.M.
Veterinary Services Laboratory
Ridgetown, Ontario

Newcastle Disease is an infectious, highly contagious and very destructive disease affecting primarily chickens and turkeys.

The severity of this condition was not truly appreciated by poultrymen in Kent County and surrounding area until July 1971. It was in July 1971 that Newcastle Disease was diagnosed in Kent County for the first time in over twenty years. After two and a half months of severe losses it appeared that the condition had been brought under control and once more eliminated from the area.

It was not until late November 1971 that a new focus of infection appeared in Lambton County and at this time there appears to be scattered outbreaks of the condition throughout southwestern Ontario.

The disease usually appears suddenly and spreads quickly through fully susceptible flocks. The incubation period following natural exposure varies from two to fifteen days. The earliest signs of the disease are respiratory in nature with gasping being the most obvious and consistent sign. Depression and impaired appetite generally accompany the respiratory signs. Nervous signs especially in young chicks appear about two to five days after the respiratory signs begin. The nervous signs commonly observed are paralysis of extremities, head shaking, torticollis, and circling. In laying flocks, egg production may drop rapidly or stop completely within five days. If the flock survives, the production usually returns within six weeks to what it was before the outbreak appeared.

Turkeys appear to be more resistant than chickens to Newcastle Disease. In laying turkeys, the primary sign observed is one of sudden loss of production with little increase in mortality. In young poults (around three weeks old) mortality may be quite severe with depression, inappetance and nervous signs predominating. The marked respiratory signs seen in chickens with Newcastle Disease is not consistent with that in turkeys.

A proper vaccination program appears to be the only method of avoiding Newcastle Disease in your flock. All flocks should be vaccinated at least three times before they are twenty weeks old and then every four months thereafter. Most vaccination programs recommend an initial vaccination for Newcastle Disease at eight to ten days of age, a booster vaccination at four to six weeks of age and a second booster vaccination at fifteen to sixteen weeks of age and then a booster vaccination every four months thereafter.

To my knowledge, all cases of Newcastle Disease diagnosed in this recent outbreak have occurred in flocks which did not receive a complete vaccination program against Newcastle Disease.

RESEARCH IN PROGRESS AT R.C.A.T.

D.G. Luckham
Head, Livestock and Poultry Division
Ridgetown College of Agricultural Technology

Poultrymen have used restricted feeding programs for many years to grow pullets. In the past it was also a practice to feed laying hens grain on top of mash at night and allow the feeders to be empty for about two hours each day before the next feeding. These practices were used to save labor more than anything else and to keep the appetites of the birds keen at all times. Since all mash feeds have been available, the practice has been to keep feed in front of the birds at all times. Researchers are becoming interested in feeding programs similar to those mentioned above.

Growing pullets on a restricted feeding program has been recommended for many years. These programs usually result in delayed sexual maturity, increased early egg size, higher rates of production and reduced adult mortality.

Scientists have been searching for a program which is self-restricting in order to eliminate the necessity for extra feeding equipment and labour. Many programs have been proposed to date such as high-fibre feeds, skip-day programs, imbalanced diets and low-protein feeds. All of these programs have been used to grow pullets from 8 weeks of age until 10 percent egg production had been achieved.

Recently there has been considerable interest in the use of low-protein starter feeds and limiting the amount of feed available in the laying house as well as the recommended restricted feeding programs.

Research at Washington State University indicated that feeding broiler breeder hens only 4 hours per day (two 2-hour periods) resulted

in a considerable saving of feed with no reduction in egg production. More important was an increase of 14 percent in the fertility of the eggs. Some reduction in egg size was noted but considered of no economic importance once peak egg production had been reached.

Restricted feeding programs have been shown at R.C.A.T. and elsewhere to be more effective with meat-type birds than with egg-type birds.

Current R.C.A.T. research programs are testing all of these programs.

Feed Restriction Programs

Programs aimed at delaying sexual maturity and restricting feed intake have been used alone or in combination in the starting, growing and laying periods with both meat-type and egg-type chickens.

Starting treatments include high and low-protein starter feeds. Growing programs include a comparison of a normal ration with an imbalanced ration and a normal ration to which thiouracil has been added. Breeder or layer feeds have been fed on a full-fed or restricted basis. The treatments are shown in Table 1.

TABLE 1

Starter	Grower	Layer
20 or 14	control	full-fed
percent		restricted
protein	feather meal diet	full-fed
		restricted
	thiouracil added	full-fed
		restricted

Each combination had at least 2 pens of 50-60 birds for data collection.

One experiment has been concluded with meat-type males and females. Duplicate experiments are in progress with meat-type and egg-type birds in separate experiments.

Preliminary results have been tabulated but not analyzed.

Low-protein starter feeds resulted in 5-8 days delay in sexual maturity of pullets. The combination of imbalanced grower feeds resulted in a further delay in maturity. Limiting feed intake in the laying period resulted in a saving of 6-10 percent of the feed, higher rates of egg production and increased fertility in broiler hatching eggs.

Fertility was markedly lower when males and females were full-fed in the growing and laying periods. Candling of incubated eggs and later switching of males indicated that the males only were affected.

Preliminary results indicate a small saving of feed when egg-type birds are limit fed (no feed 2 hours each afternoon) in the laying house.

It appeared as though more eggs were produced per hen housed when pullets were grown on a 20 percent protein starter and were limited in laying feed intake regardless of growing program. This was not true for pullets started on low protein feeds.

Results to date indicate that restriction programs in the growing and laying periods could be used in conjunction with high-protein starters. However, if low-protein starter feeds are used, they should not be followed by restriction programs in the growing and laying periods.

Feeding Time For Laying Hens

Studies at Washington State University suggest that a reduction in feed costs may be achieved by limiting the time feed is available each day to 4 hours per day. Apparently egg production was

not affected. Some reduction of egg size was noted but not considered to be of economic importance once peak production had been reached.

Cornell and Guelph workers have reported that the calcium in the feed should be available at night when egg shell formation takes place.

The old practice of feeding birds late in the day so they would go to bed with full crops and have access to feed early in the morning may have had some merit. Feeders were allowed to be empty for a time each afternoon before feeding time.

An experiment was designed to test the effect of feeding time on feed consumption and egg production. Caged layers which had been started on high or low-protein starter feeds were used in the experiment. The treatments shown in Table 2 were begun when the pullets were 20 weeks of age. Light was available 16 hours per day.

TABLE 2 - Feeding Time For Caged Layers

1. Full-fed - feed available at all times.
2. Night - feed available 8 hrs. 4:30 p.m. to 8:30 a.m.
3. Day - feed available 8 hrs. 8:30 a.m. to 4:30 p.m.
4. Split - feed available 4 hrs. 8:30-10:30 a.m. and 2:30-4:30 p.m.

After 140 days, it would appear that less feed is consumed and feed efficiency is greater with day feeding although rate of egg production was slightly lower than night feeding. The split feeding times resulted in a further reduction in feed intake. Time of feeding appeared to have little effect on overall egg production.

A slight increase in rate of egg production was observed in those pullets fed a low-protein starter feed.

Results to date are encouraging and interesting but are only preliminary until a full 12 months of lay have been completed.

GETTING THE MOST FROM YOUR PULLETS

J.D. Summers
Dept. of Animal and Poultry Science
University of Guelph

A profitable poultry operation is the objective of every poultry producer regardless of the particular segment of the industry that he is in. Although all segments of the industry have their "ups" and downs" with regard to disease and management problems, no segment is as dependent on good management and feeding practices to be successful as is the commercial egg producer. Rather than disposing of his product after a relatively short growing period where most of the costs have occurred in a relatively short period of time, the egg producer must nurse his birds along for at least 10 to 12 months before there is any chance of showing a profit on his investment. Hence, it is imperative that he have a healthy and vigorous pullet to place in the laying pen if he is to show a profit on his laying operation.

The importance of a good pullet cannot be overstressed. Many poultrymen spend far too much time investigating the proper strain of bird and "haggling" over the price of chicks and feed as compared to the time spent in planning for and carrying out a good pullet growing program. Good chicks and feed are important, however, even more important is the management of the birds and the feeding program imposed on the flock.

The ultimate of any growing program is to produce a pullet of desired weight and body composition at point of lay. The big question that hasn't been satisfactorily answered is, "what is the desired weight and body composition"? Most people try to produce pullets of a specific body weight, however, it is well known that body weight itself means very little unless the birds have been on a feeding program that results

in a particular body composition at point of lay. In Table 1 is shown the influence of feeding program on body composition and age at first egg. The restricted birds were leaner and were delayed 5 (daily restriction) and 19 (skip-a-day) days in coming into production as compared to the control birds. Much more information is required before good recommendation can be made on this point, however, it is well known that body composition at point of lay is an important factor for a profitable flock.

In the past, many growers have grown their pullets relatively fast to 8 weeks of age and then have spent the next 10 to 12 weeks trying to slow them down. This places a stress of rapid growth on the pullet to 8 weeks and then, in many cases, a severe stress of nutrient restriction during the 8-20 week growing period. In figure 1 is shown the type of growth curve that most growers have obtained in the past and also the type of slow straight growth curve that we are now trying to promote. There is good evidence to indicate that a better pullet is obtained if a slow, but steady, growth pattern is obtained from day of age to around 20 weeks of age.

In order to achieve this reduced weight gain, some type of nutrient restriction program is necessary along with a good lighting program. In table 2 is shown the results of feeding a low protein diet to pullets from day of age to 8 weeks. A marked reduction in growth can be noted for the low protein diet. With this reduced weight gain to 8 weeks of age a less severe nutrient restriction program has to be carried out from 8 to 20 weeks of age. A number of feeding programs can be employed during the 8-20 weeks growing period e.g. manual restriction, skip-a-day or the feeding of an amino imbalanced diet. In Table 3 is shown the results of feeding pullets several different growing diets.

The feathermeal diet (an amino acid imbalanced diet) resulted in a marked reduction in body weight. This type of reduction can be achieved with other feeding programs (skip-a-day) (daily restriction) and the type of program to use will depend on a particular situation. By and large, birds should be of equal quality on the various systems if they are managed properly.

The bran diet did not restrict weight gain in this particular study, but by increasing the level of bran or any other fibrous material, a reduction in weight could have been achieved. However, as noted by the increased feed consumption, this method of feeding is not practical today.

Continue to keep pullets on the growing program till around 5% production, then place on a good laying diet and full-feed. It used to be recommended to feed calcium free choice or at 2% of the diet starting around 2 to 3 weeks before production commenced. However, recent work has indicated that better calcium retention is obtained at the start of egg production if the hens are kept on a low level of calcium till around 5% production.

The reasoning behind this change in feeding calcium is to take advantage of the hen's ability to alter her percentage calcium retention, depending on the level of calcium in the diet. In Table 4 is shown percentage calcium retention at various levels of dietary calcium. By keeping the diet low in calcium, the hen is very efficient in retaining calcium. When egg production commences and high dietary levels of calcium are fed, the hen continues the high degree of calcium retention in relation to her new higher requirements, rather than taking several weeks to adjust her efficiency of calcium utilization upwards.

When a flock begins to lay, a steep production curve is obtained

similar to the values shown in Table 5. However, if one looks at the way hens actually begin to lay (Table 6), it may be noted that a hen continues laying after her first egg. Hence, there is no gradual curve to peak production for the individual hen. The production curve we are so familiar with is only the average of hens coming into production early and late.

In figure 2 is shown a curve for the body weight of hens coming into production. A marked increase in weight gain is noted starting approximately two weeks before production. This gain then plateaus after production commences. In figure 3 is shown egg weight increase for the hen coming into production. It may be noted that egg size increased markedly up to 28 days then fell off. Again demonstrating that the average value we see for increasing egg weight of a flock tells us very little of what actually takes place with the individual bird.

Much more work is required before an optimum feeding program for layers is obtained. However, from our present knowledge, we know that hens can be fed much more efficiently than they are today. It has always been felt that a hen had to gain weight during the laying cycle in order to be in good health and continue to lay satisfactorily.

In Table 7 are shown the results for a laying test where the birds were kept in temperature controlled rooms and fed a high and low energy diet. Production differed between the two diets, however, it was similar for both rooms. Feed utilization was significantly different in the cold room, however, for the hot room the high and low energy diets resulted in similar feed utilzation values. These data indicate that birds do not have to gain weight in order to produce satisfactorily, in fact it shows that they can be producing even when losing body weight.

A few years ago, phase feeding was introduced as a means of

reducing egg size and thus increasing egg shell quality and also as a means of reducing feed costs during the latter stages of egg production. This method of feeding was successful when used properly, however, it was never really totally accepted by the poultry producers. What one is really looking for is some way to reduce feed intake and still maintain good production. In Table 8 is shown work done by Washington workers where they limited the time the hens had access to feed. Note 4 or 6 hours of continuous feeding resulting in poorer performance than the 14 hour control treatment, however, the two 2-hour feeding schedule gave performance equal to the control. The reason for the two 2-hour feeding program being successful is more readily apparent when one studies the laying and feeding pattern of the hen.

In Table 9 is shown the time that eggs were laid during a 16-hour day. Note most of the eggs were laid during a 6-hour period from 8 to 12. In Table 10 is shown the feeding pattern of hens when allowed to eat nutrients free choice. The "mash" refers to ground corn (with vitamins and minerals), the pellets to pelleted soybean meal (with vitamins and minerals), and O.S. to oyster shell. Thus the hen had free access to energy, protein and calcium.

Note the hens ate relatively large quantities of protein around the time of heavy egg production which is also the time of the beginning of egg formation for the following day. Little calcium was consumed in the morning but large quantities were consumed in the latter part of the day when the egg would be in the shell gland and thus the hen's requirement for calcium would be high. The data demonstrate that the hen has a cyclic need for nutrients during the day. Hence the two 2-hour feeding program tested by the Washington workers probably allowed the hen to eat in the

morning for protein and the afternoon for calcium thus resulting in good performance. Some method must be devised to take advantage of this type of feeding program. Some growers are already feeding oyster shell free-choice and removing a similar quantity of calcium from the diet. This method of feeding has had a noticeable effect on egg shell quality.

All these tables point out the fact that the hen can be restricted in feed intake and still perform satisfactorily. Advantage must be taken of this finding if optimum efficiency of feed is to be achieved.

In Table 11 is shown the effect of temperature and energy intake on egg production. At 50°F and 200 Kcal. of M.E. per day intake, production was only 46%. By increasing temperature to 80%, a 20% increase in production was obtained. This marked increase in production was obtained due to the fact that less energy was being used for body heat or maintenance. Such results should make the egg producer take a hard look at heating his laying house. Egg size was reduced at the higher temperature. This is a result of insufficient protein intake and could be readily changed by increasing the protein content of the diet.

Regardless of how it is accomplished, growers must work toward reducing feed intake of their hens by 5 to 10 percent. Not only will this reduce cost of production but may also lead to enhanced performance due to less obese hens in the laying house.

TABLE 1

Effect of feeding program on carcass composition and sexual maturity

	Control	Daily Restricted	Skip-a-day
Av. wt. (140 days) (gms)	1894	1525	1517
Feed intake (80-140 days) (gms)	7329	3995	3990
Age at first egg (days)	145.2	150.6	166.2
Body fat (%)	24.0	13.0	15.8

FIGURE 1

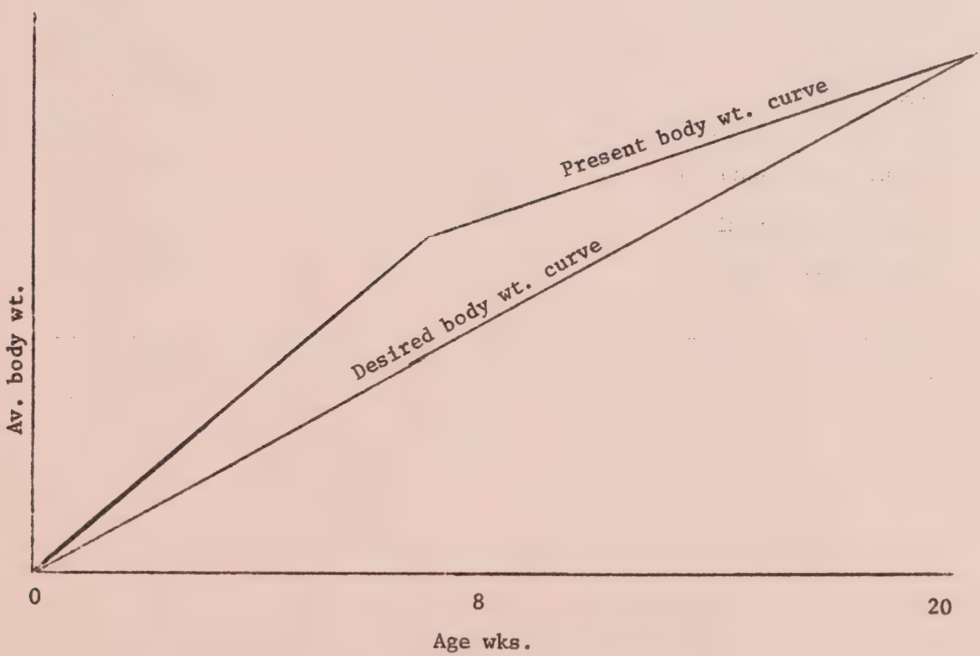


TABLE 2

Av. weight gain for pullets fed 20 and 14% protein diets

Treatment	Av. wt. (gm.) 8 wks.	Av. wt. (gm.) 20 wks.*
20% protein	657	1308
14% protein	485	1208

*Birds were on common diet from 8-20 wks.

TABLE 3

Performance of pullets fed three different growing diets from 8-20 wks.

Treatment	Av. wt. (gm)	Av. feed cons. /bird (gms)
Corn, soya (control)	1323	59.9
Corn, feathermeal	1070	53.5
Corn, soya, bran	1338	67.2

TABLE 4

Percentage calcium retention at various levels of dietary calcium

Dietary Ca (%)	Daily Ca intake (gm)	Calcium retention (%)
2.40	2.63	62.4
2.66	3.24	60.6
2.91	3.56	46.8
3.15	4.22	43.9

TABLE 5

Weekly percentage production to peak

Weeks	Production (%)
1	35.0
2	58.3
3	77.7
4	85.4
5	90.0
6	95.1
7	93.7
8	92.6

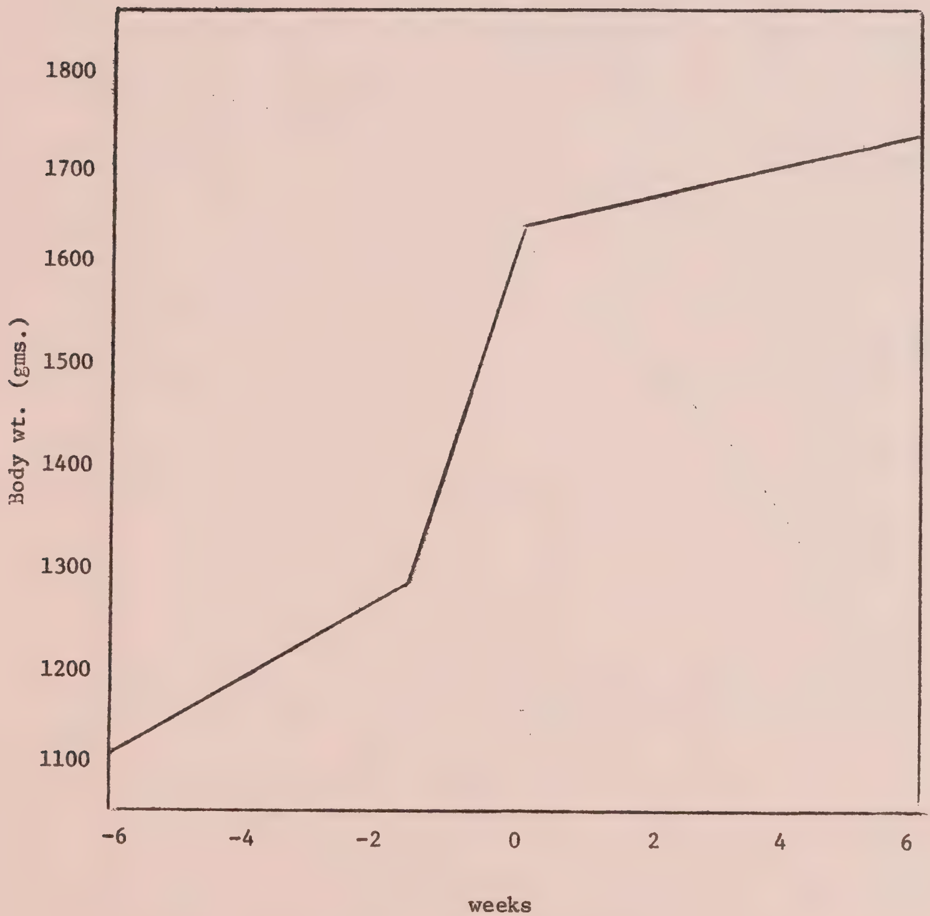
TABLE 6

Rate of onset of egg production

No. eggs per week	Weeks 1	2	3	4	5	6	7	8
7	1	22	41	52	53	73	59	58
6	11	24	29	30	37	24	38	34
5	13	7	7	6	6	1	3	6
4	10	7	6	4	0	1	0	2
3	14	10	5	2	2	0	0	0
2	6	4	3	1	0	1	0	0
1	13	9	3	0	1	0	0	0
0	32	17	6	5	1	0	0	0

FIGURE 2

Body weight of pullets before and after the onset of production



Hurwitz & Bar - 1971

FIGURE 3

Egg weight during the early production periods

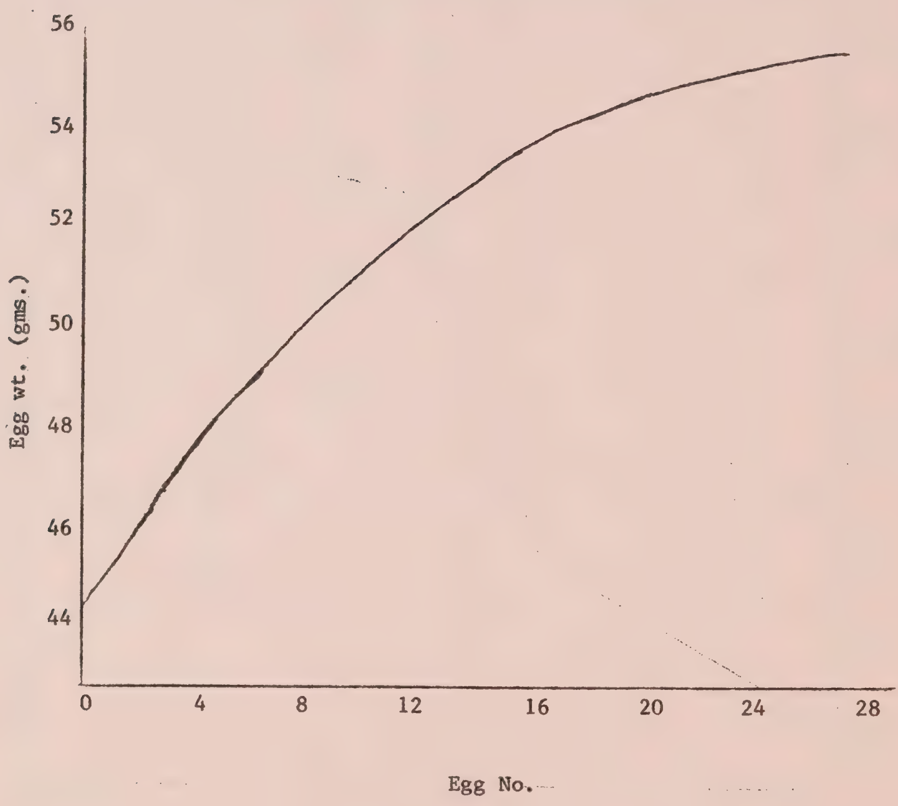


TABLE 7

Influence of environmental temperature and diet on production and feed per dozen eggs

Initial body wt. = 1600 gms.

	Cold room (55°F)		Hot room (85%F)	
	H.E.[1]	L.E.[2]	H.E.	L.E.
Egg wt. (gm)	55.8	55.6	52.5	51.5
Production (%)	80.0	75.2	80.9	76.0
Feed/doz. eggs (lbs.)	3.47	3.73	3.23	3.27
Body wt. (gm)	1691	1609	1606	1509

1. High energy diet

2. Low energy diet

TABLE 8

Effect of restricting feeding time on egg production, egg size and feed consumption

(29-43 wks)

Feeding time	Egg Prod. (%)	Egg Wt. (gm)	Feed/bird/day (gm)
14 hrs.	86.4	58.8	110.8
4 hrs.	77.4	55.3	82.2
6 hrs.	79.4	55.8	80.3
2-2 hrs.	86.0	56.8	92.8

TABLE 9

Feed consumption and egg production of hens during a 16 hour light period

Time	Av. feed intake (gm)	% eggs laid
6-8 A.M.	9.3	00
8-10	12.6	19.2
10-12	14.9	44.4
12-14	16.9	29.3
14-16	15.3	5.1
16-18	14.0	2.0
18-20	17.1	0
20-22	14.1	0
Daily total	114.2	

TABLE 10

Average periodic feed consumption of hens fed energy, protein and oyster shell free choice

Time	Feed Consumption (gm)		
	Mash	Pellets	Oyster Shell
6-8 A.M.	7.0	1.0	0.5
8-10	14.2	5.0	0
10-12	15.1	5.4	0
12-14	8.4	3.0	0.1
14-16	10.8	2.6	0.5
16-18	11.7	3.1	1.3
18-20	9.4	2.9	3.1
20-22	9.2	2.5	3.1

TABLE 11

Influence of controlled energy intake on egg production

Tempt. ^{o}F	Energy intake Kcal/hen	% prod.	Av. egg wt. (gm)
	200	47.0	55.2
	220	56.4	54.8
50	240	70.6	54.5
	260	72.0	55.4
	200	66.0	52.5
	220	71.3	53.0
80	240	79.4	55.3
	260	79.5	55.0

(Poultry Digest, Jan. 1971).

POULTRY OUTLOOK '72

M.S. Mitchell
Poultry Division
Canada Department of Agriculture

Normally, Outlooks for the year ahead are prepared several months in advance of the New Year and those preparing such reports make predictions with the facts at hand which must include a degree of speculation on how the old year will end. Thus preparing Outlook reports, while being an essential aspect of any enterprise, always have inherent hazards, particularly the long term forecast.

"Well", you may ask, "what is so difficult about an outlook report for 1972 when (at this time of writing) it is already mid-December and the New Year is upon us"?

To answer the question, I could ask several others. Will national production controls become effective in 1972 in the poultry industry either through provincial board actions or Bill C-176? Will Ontario and Nova Scotia, still outside the group of those with provincial egg boards, get provincial control programs? What is the total effect of the use of Marek's vaccine, and is it true that some of the original users have eased off from its use? Has the industry become overly complacent, too remotely controlled, or was the laryngotracheities outbreak in British Columbia and is the Newcastle now in Ontario, the forerunners of more serious disasters? Why is at least one major feed mill in the United States withdrawing from the poultry industry? Will the United States government pass legislation to control surplus egg production?

It is possible to list other areas of concern and uncertainty but then what December of any year hasn't held many unsettled issues and a degree of insecurity for the future.

However, this December does have something different. The big difference is that production in 1972 will likely be controlled to a far greater extent than other years by quotas and market sharing agreements between provinces. The 1971 "Chicken and Egg War" is over, peace may not have totally settled in, but at least there is a truce. Industry representatives along with Federal and Provincial officials are meeting to study three basic issues:

(a) Production planning with levels and methods of production control;

(b) market sharing between provinces and areas;

(c) the application of the Agricultural Products Marketing Act (Canada) to facilitate the administration of interprovincial agreements.

To date considerable progress has been made toward the preliminary drafting of an interim comprehensive egg marketing plan. In addition, the provinces have been polled with respect to specific questions of policy related to such a plan whether it be for eggs, broilers or turkeys. As one might expect, there is not unanimous agreement on all the terms and conditions being studied or on the next stage of development. However, interest remains high on working out the peace as witnessed recently when a majority of the 10 provincial ministers of agriculture expressing their view that national market sharing was the best means of obtaining stability in the poultry industry.

Statistically, the outlook for 1972 compared to 1971 is briefly less eggs and turkeys and more broilers.

Record numbers of eggs will be marketed through registered stations in 1971 (10.7 million cases). The increase will be about 5% more than 1970 and 20% more than the1966-70 average of 8.9 million cases. Approximately 70% of all eggs produced are sold through registered

stations. In Ontario the 1971 production increase will be 7.5% over 1970.

Production in 1972 will be down compared to 1971 by perhaps as much as 5% and be equivalent to 1970. Certainly if producers want to escape the low prices that have featured egg production for the past 22 months, the total egg supply must be reduced. Chick placements throughout 1971 have been lower and hence less hens are maturing; however, the Marek's vaccinated stock is showing better livability and a higher rate of lay, hence, less hens are needed. A figure of 25 million laying hens is often quoted as sufficient for our needs. Statistics Canada reports over 28 million layers still on farms so continued reduced chick placements are warranted.

Prices will continue to strengthen into the New Year and their rate of increase will be controlled as much by the U.S. situation as by our own egg supplies. The United States industry has not shown the same degree of cut-back as experienced in Canada so their improved position will come slower and later than ours. Thus, the threat of importations, if our prices rise too quickly, vis-a-vis the U.S., will temper any price changes in Canada. Under these same situations there is no likelihood of exports, hence there is only the Canadian market available.

Regarding storage stocks of frozen egg products, it is significant to note that these are at record high levels. While breakers have been willing to buy large quantities of eggs at recent low prices and build up inventories, there has also been very low priced foreign product moving into Canada from countries which have placed this product on the international market as a means of correcting surplus problems in their own countries. Demands are currently being made by industry representatives to curtail these imports. Certainly a viable egg

processing industry must be an integral part of any egg production and marketing system.

It appears that the real meaningful outlook for the egg industry in 1972 is not so much concern about numbers of hens or egg prices, but new industrial uses for eggs and imaginative ways to increase consumption of one of nature's most perfect foods.

For the eight-year period 1963 - 1970 inclusive, per capita consumption of eggs fluctuated between 245 and 260. The highest per capita consumption, of 320 eggs, occurred in 1931, and the highest year of recent times was 1957, with 299 eggs. Should we be satisfied with this static consumption pattern and the outlook that the only increase in sales will be from an increasing population? Should the egg industry in 1972 and in future years settle for a matching of demand and supply and do little to increase demand?

True, productivity must be matched with demand as a small surplus can depress a market -- it is estimated in eggs on a free market that a one per cent increase or decrease in supply changes the producer price by three per cent in the opposite direction. However, the future challenge is not so much controlling levels of production but instead promoting demand.

Surveys show that, as a group, teenaged girls eat many less eggs than teenaged boys or their parents. These teenaged girls are homemakers of the next decade. Can we expect them to automatically begin to increase their egg consumption as they become parents and promote egg eating habits in their children?

As people associated with the poultry industry, we are part of the business of food production. Today, as in no previous generation,

the consumer has a greater choice of foods, more money to spend on foods, more knowledge of nutritional requirements, places more emphasis on packaging and convenience of food items, and probably feels she has less time to spend preparing meals. Also today, as in no previous generation, has there been such keen competition for the consumer's attention when purchasing food items.

The nutritional value of eggs and the low-fat, high-protein content of poultry meats is a selling feature seldom stressed; the cost per pound of edible food of eggs or poultry is also equally understressed to the consumers; and, perhaps of greatest importance, how little we have changed the presentation of our product to the consumer -- still a one dozen egg carton, and with turkeys, still basically a whole bird good only for roasting.

Moving briefly to the outlook in 1972 for turkeys and chickens, it appears both of these segments of the industry, particularly chicken broilers, have reached a point where production controls in most provinces have given a degree of stability in the broiler market. Modest production increases are forecast for 1972 in anticipation of the continued increase in consumption of chicken meat.

Turkey producers suffered from overproduction in 1971. This situation was aggravated by the imposition of the U.S. surcharge, which effectively stopped the small but developing movement of live turkeys to the U.S., and the increased consumption of pork experienced in the last year in Canada. Late in the year, there was a substantial export movement of heavy eviscerated stock to the United Kingdom. These exports, coupled with a substantial Thanksgiving movement and the purchases by the Agricultural Products Board, have given what some have described as the

best clean-up of heavy turkeys in the last five years.

The turkey industry, through negotiations between provincial boards, has agreed to reduce production by ten per cent in 1972. If the boards can control this decrease, all remaining surplus stocks should be consumed in the first half of 1972 and prices show a firming trend throughout the period. Thus the outlook is for much improved conditions in the new year and the rate and magnitude of the improvement is a direct test of the strength of the turkey producer boards.

Any report on outlook '72 must give some recognition to the efforts being made to establish some means of national supply management. Whether this will come within the year through national legislation, or some other form of agreement, or if indeed it will come at all, is, at this writing, very difficult to predict.

Certainly, all segments of the industry must want to pull out of these last months of disastrously low prices and head into a prolonged period of stability and profits. No one expects utopia and there is no panacea; however, there will be change.

Those who are formulating policies to steer this change will need to keep a very delicate balance between supply, price and consumer desires. If the producers are not making sufficient profit to continue a viable enterprise, if prices rise so high that consumers substitute other products in lieu of poultry products, or, if the product offered is not in the form the consumer prefers, the result is the same -- a shrinking industry.

It is the same dilemma agricultural products have experienced before: On the one hand, programs which will assure producer incomes; on the other, a continuous supply, domestically and even internationally,

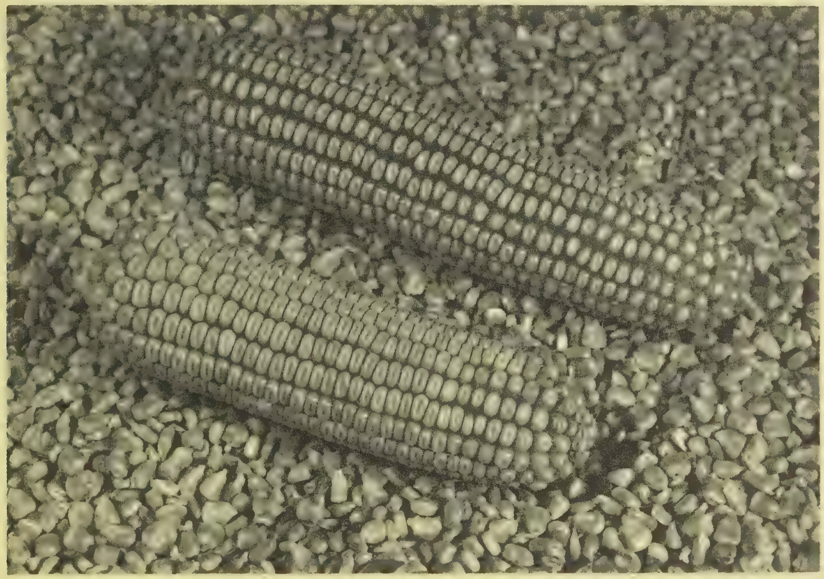
of what the consumer wants in the form and at the time it is required and at a price competitive with other products available.

Perhaps, though, 1972 is different. This is now the age of the jumbo jet (cheap, quick, long-haul transportation), synthetic foods ($10,000,000 worth of "meat" now sold annually in U.S.), industrialized agriculture (factory farming), electronic dispensing and cooking of foods, and changing eating habits, particularly of the masses in urban centers as the four-day week becomes a reality.

The metamorphosis now being experienced by the poultry industry will need to produce a production <u>and</u> marketing system capable of meeting the challenges of the mid-seventies. Thus, the outlook for '72, while tempered with apprehension, must surely be one of great hope for producers. The issues and the decisions for the future have never been more squarely on their shoulders. These decisions must be for the long term. Patience, tolerance, and above all, production and marketing intelligence, will be the keys to success.

SUMMARY

SOUTHWESTERN ONTARIO FARMERS' WEEK
AT
RIDGETOWN COLLEGE OF AGRICULTURAL TECHNOLOGY



GRAIN CORN
Wednesday January 12, 1972

ONTARIO DEPARTMENT OF AGRICULTURE & FOOD
PARLIAMENT BUILDINGS, TORONTO

EVERETT BIGGS/DEPUTY MINISTER HON. WM. A. STEWART/MINISTER

FOREWARD

The Southwestern Ontario Farmers' Week is a result of the deliberations of many individuals beginning in early October. Most segments of the agricultural community of Southwestern Ontario are represented with the emphasis on the farming sector.

The sessions containing discussion on current topics of interest to many people are repeated each day so that as many as possible may participate. A summary of each presentation is contained in this booklet. It is hoped that this information will be of use to each and every farmer interested.

Among the organizations responsible for the planning of the 1972 Farmers' Week are:

Soil and Crop Improvement Associations, Milk Committees and Beef Improvement Associations of the Counties of Essex, Kent, Lambton, Elgin and Middlesex

Kent Vegetable Growers' Association

Essex Vegetable Growers' Association

Ontario Bean Producers' Marketing Board

Ontario Soya-bean Growers' Marketing Board

Ontario Department of Agriculture and Food

Harrow Research Station (Canada Department of Agriculture)

We, at the Ridgetown College of Agricultural Technology, are pleased that the planning committee has seen fit to make use of the facilities available here at the College.

If farmers should want to contact research personnel at the Harrow Research Station, or the Ridgetown College of Agricultural Technology, the staffs of both stations are listed with the specific area in which they conduct research.

Harrow Research Station

Canada Department of Agriculture

Department and Personnel	Area of Research
CHEMISTRY AND WEED SCIENCE	
Dr. G .M. Ward	Head of Section Greenhouse vegetable crops. Nutrition, production, biochemistry of tomatoes and cucumbers.
Dr. A.S. Hamill	Effect of herbicides on weed species and weed population shifts, influence of weed competition on crop yields.
Dr. P.B. Marriage	Herbicide physiology and persistence.
Dr. W.J. Saidak	Weeds, weed control, herbicide evaluation and herbicide translocation.
Dr. F.G. von Stryk	Pesticide chemistry. Residue analysis, systemic insecticides, fungicides, herbicides.
CROP SCIENCE	
C.G. Mortimore	Head of Section Corn breeding, stalk rot research, agronomic studies.
L.J. Anderson	Variety testing of corn, soybeans, and cereals.
Dr. J.W. Aylesworth	White bean breeding and production practices.
Dr. B.R. Buttery	Soybean physiology and biochemistry.
Dr. R .I. Buzzell	Soybean breeding and genetics, agronomic studies.
W.A. Scott	Burley tobacco management.
ENTOMOLOGY	
Dr. C.D.F. Miller	Head of Section Cereal and forage crop insects (Cereal leaf beetle - Alfalfa weevil)
Dr. W.M. Elliott	Vegetable insects (peach aphid, *Myzus persicae*) on potatoes.
Dr. W.H. Foott	Field crop and vegetable insects (Corn leaf aphid - Sap beetle)
Dr. R.P. Jacques	Insect pathology. (Cabbage looper - cabbageworm)
Dr. P.W. Johnson	Plant parasitic nematodes. (Root-knot nematode - lesion nematode on greenhouse vegetables)

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Department and Personnel	Area of Research
Entomology - continued	
Dr. R .J. McClanahan	Greenhouse insects. (Two-spotted spider mite - greenhouse whitefly, integrated control)
H.B. Wressell (Chatham)	Field crop and vegetable insects. (Insects on white beans, corn and tomatoes)
HORTICULTURAL AND SOIL SCIENCE	
Dr. J.M. Fulton	Head of Section The water requirements of crops, soil moisture, irrigation, evapotranspiration.
Dr. E .F. Bolton	Soil physics, cropping systems, cultivation, tillage, soil aeration and drainage.
Dr. W.I. Findlay	Soil fertility maintenance, build up and decline; crop fertilizer requirements, and time of application.
Dr. R.E.C. Layne	Tree fruit breeding. Winterhardiness. Disease resistance. Peach rootstocks.
V.W. Nuttall	Vegetable breeding. Genetics. Greenhouse and pickling cucumber breeding.
Dr. H.A. Quamme	Tree fruit breeding. Fireblight resistance of pear. Cold-hardy dwarfing rootstocks for pear.
PLANT PATHOLOGY	
Dr. C.D. McKeen	Head of Section Greenhouse and field vegetable diseases. Verticillium wilt. Evaluation of fungicides on vegetables.
Dr. B.N. Dhanvantari	Tree fruit diseases. Peach canker, bacterial leaf spot of peaches and apricots. Crown gall.
Dr. John Dueck	Bacterial diseases of fruit and vegetable crops. Fireblight of apple and pear. Bacterial spot of pepper
Dr. L.F. Gates	Corn root and stalk rot and other corn diseases. Viruses of cereals and legumes.
Dr. J.H. Haas	White bean and soybean diseases. Bacterial blights, bronzing and root rots.
Dr. R.N. Wensley	Soil microbiology. Fusarium wilt and root rot diseases of melons, asparagus and other vegetable crops.

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Ridgetown College of Agricultural Technology
Ontario Department of Agriculture and Food

Department and Personnel	Area of Research
AGRICULTURAL ENGINEERING	
P.H. Bomford	Head of Department. Corn and Soybean harvest losses. Grain drying systems.
R.E. Clayton	Extension engineer (Kent County) in farm buildings, farm drainage and farm machinery.
M. Sojak	Environmental control (ventilation). Drainage systems (durability of plastic drains and drain maintenance. Specialized machinery.
BIOLOGY AND HORTICULTURE (and weed control)	
R.H. Brown	Head of Department. Evaluation of chemical weed control in corn, burley tobacco, asparagus, red beets, tomatoes and strawberries. Control of Quackgrass and fall panicum.
Dr. B. Bolwyn	Insect and disease control in corn (Northern corn blights, rootworm) white beans (white mold).
J.K. Muehmer	Variety evaluation and production techniques in processing crops (sweet corn, tomatoes, peppers, cucumbers).
J.E. Shaw	Evaluation of chemical weed control in soybeans, white beans, kidney beans, lima beans, cereal grains, alfalfa, cucumbers, potatoes. Control of velvetleaf, Jimsonweed, and Black Nightshade.
CROPS	
A.D. McLaren	Head of Department. Variety evaluation and production techniques in corn and forages.
R.C. Jenkinson	Variety evaluation and production techniques in cereals and winter wheat and spring wheat.
D.A. Littlejohns	Variety evaluation and production techniques in soybeans and white beans.
A.K. Brooks	Extension in Crop Production - Middlesex and Elgin Co.
W.W. Parks	Extension in Crop Production - East Kent and Lambton Counties.

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Department and Personnel	Area of Research
FARM MANAGEMENT AND ECONOMICS	
D. Beattie	Head of Department, Farm management and production economics of livestock.
S.J. Usher	Marketing agricultural products, agricultural policies, economics in swine production.
LIVESTOCK AND POULTRY	
D.G. Luckham	Head of Department. Nutrition and egg production, feeding broiler hatching flocks.
J.E. Core	Beef and Dairy rations. Stored feeding programs including stover silage, silage additives.
A.A. Campbell	Chemical components of feed.
J.R. Morris	Selection of swine breeding stock, herd health. Evaluation of additives (protein supplements, antibiotics.) Feeding of high moisture corn stored with organic acid to finishing hogs.
SOILS	
Dr. C.S. Baldwin	Head of Department. Plastic coated corn and spring wheat, nitrogen in spring wheat and white bean production.
R.W. Johnston	Calcium, magnesium, and micronutrients in field crops (corn, soybeans, white beans, and forages).
C.K. Stevenson	Evaluation of nitrification inhibitiors in the nitrogen fertilization of corn. Soil fertility maintenance, time of application of fertilizers.
VETERINARY SERVICES LABORATORY	
Dr. F.J. Harden	Head of Department. Assistance given in diseases of all classes of livestock.
Dr. R.E. Clugston	Assistance given in diseases of all classes of livestock.
Dr. D.A. Stevenson	Assistance given in diseases of all classes of livestock.
AGRICULTURAL LABORATORY TECHNOLOGY	
Dr. J.H. Brimner	Coordinator of course, chemical components of crops and feeds.
AGRICULTURAL SECRETARY	
R.C. Wagner	Coordinator of course. Farm accounting and agricultural policy.

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REPORT OF THE FIRST ONTARIO GRAIN CORN INDUSTRY CONFERENCE

by R. F. Heard

The chairman of today's program planning committee asked me to give a report of the Grain Corn Industry Conference held at this College last September. Since I acted as Chairman of the Conference, I readily accepted.

Since all the presentations and discussions at the Conference has been compiled into one single report - and is available to you - this overview will be greatly abbreviated. It is but my interpretation of the Conference addresses and discussion.

Why The Conference?

I was transferred to this area by the Ontario Department of Agriculture and Food eight years ago. In my management advisory role, I became particularly conscious of the rapid developments taking place in the corn industry in Ontario. As an active member of the Ontario Institute of Agrologists, I have the opportunity of meeting with other agrologists who are employed in various facets of agri-business. I found that both the farmers and the agri-business people were asking questions concerning developments in the corn industry and in some cases were making statements of varying degrees of validity, and often contradictory in nature. It was evident that there was not a tendency to look at the total industry but rather a strong inclination for the person to look at his own facet of it quite in isolation. An example will illustrate this point. On contacting an industrial user of corn for support of the

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Canadian Seed Growers' Annual Convention in London last year, I was confronted by the statement that the industrial user was at a loss to know why he should have any interest in being associated with the Canadian Seed Growers' Association. He could see nothing that research and seed production contributed to his corn utilization program.

The industrial market (non-feed) is regarded as the premium market for Ontario corn. Yet it appeared that some of these markets were not being filled by Ontario corn. The question is why and how can this be changed?

The Special Committee on Farm Income conducted a study of the corn industry in Ontario and published its report in July 1969. At first this publication received limited discussion and some critical comment, and since then has been let sit. It appears that the information in it is not being assimilated or that the recommendations made in it have caused many of us to close our minds to the information it contains.

The Education Committee of the Ontario Institute of Agrologists discussed these various aspects of the corn industry situation and reached the conclusion that some type of conference was warranted to try and bring about an improved communication situation among the different sectors of the industry. However, the O.I.A. is not adequately endowed, having available only its membership fees for financial support, so an approach was made to the Ontario Food Council to see if this Council would consider the

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situation and if it concurred with the O.I.A. analysis, perhaps it could sponsor the Conference. It was recognized that the Food Council had very successfully sponsored a similar conference on white beans.

Mr. D. E. Williams, Chairman of the Ontario Food Council, reviewed this matter with his Council. The reaction was favourable, with the result that on March 1, 1971, the Food Council convened a steering committee meeting with industry-wide representation to consider organizing a corn industry conference. At this steering committee meeting it was decided to support a grain corn industry conference.

The following objectives were enunciated:

1. To improve communication within the total grain corn industry.
2. To analyse the implications of expected changes in the 1970's for the Ontario corn industry.
3. To identify and explore opportunities in production, storage, continuity of supply, utilization, and expansion for the Ontario grain corn industry.

A conference Committee was named by the March 1 meeting:

Chairman - R. F. Heard,
Ontario Department of Agriculture and Food,
367 Ridout St. N., London 12, Ontario.

Vice-Chairman - D. E. Williams,
Chairman,
Ontario Food Council.

Executive Secretary - M. A. Huff,
Ontario Food Council.

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Mr. E. M. Jones,
St. Clair Grain and Feed,
Chatham, Ontario.

Mr. Ross Leedham,
O.S.C.I.A.,
R. R. #2,
St. Williams, Ontario.

Mr. W. H. Timmis,
House of Seagram,
Waterloo, Ontario.

Mr. W. W. Snow,
Principal,
Ridgetown College of
Agricultural Technology.

Mr. Williams indicated that the Ontario Food Council would be willing to act as sponsor of the Conference and provide the support staff and funding required.

Who Invited?

The Conference Committee felt that a concerted effort should be made to have all segments of the industry represented at this first conference. It was recognized that this was not to be a conference of corn growers only. However, since corn growers are the most numerous of all participants in the industry it seemed fitting that growers should also be the largest single group at the conference. This was the case.

To facilitate the organization of the conference, invitations were extended to a number of organizations as follows:

Ontario Soil & Crop Improvement Association	- 20
Ontario Federation of Agriculture	- 5
National Farmers Union (Ontario Branch)	- 5
Ontario Grain & Feed Dealers Association	- 20
Association of Canadian Distillers	- 7
Wet Millers	- 2
Cereal Manufacturers	- 22
Canadian Feed Manufacturers Association, Ontario Division	- 7
Canadian National Railways	- 1
Automotive Transporters Association	- 1
Brokers - Toronto Board of Trade, Grains Section	- 3
Eastern Elevators Association	- 3
Seed Corn Dealers Association	- 2
Atlantic Feed Manufacturers Association	- 1

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The first morning of the conference included an examination of the industrial market for grain corn.

Feed Manufacturing - by A. O. Walberg, U.C.O.

Starch Manufacturers - by Donald A. Ross, Canada Starch Co.

Cereal Manufacturing - by Stewart M. Iockington, Quaker Oats Co.

Distilling - by William H. Timmis, House of Seagram

On-th-Farm Use - by Harvey Wright, Ontario Department of Agriculture and Food.

From this session it was apparent that the feed manufacturers would use about 35 million bu. of corn, and the other industrial users combined, about 30 to 32 million bu. The balance of the crop is fed on the farm or shipped to the eastern provinces for feed.

The next question considered by the Conference was that of facilities for handling and storing the grain. Gordon W. McNearn, Manager of Norfolk Co-op spoke to this subject and indicated that "the trade" estimates that there is a 10 million bushel shortage of country elevator capacity to adequately handle the corn crop.

Maurice Lavallee, Manager of Co-op Federée of Quebec then shared his thoughts on the Montreal and Eastern Canada Markets. He indicated that Quebec and the Maritimes are importers of feed grains (60 to 65 million bushels to Quebec and 13 million to the Maritimes from Western Canada). Traditionally, Ontario corn has not been available on a year-round basis, but it could substitute for much of the Western Canada grain under the appropriate circumstances.

Mr. Richard Strauss, President of Agro Co. of Canada, Montreal, discussed the topic - "Moving into the Export Market".

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He recited many problems faced by the exporter and appeared to conclude that only if prices were very low, and quantities on high large, would it be feasible to entertain the idea of off-shore shipment.

Prof. Robert G. Marshall, Department of Agricultural Economics at University of Guelph reviewed government policy and its implications for the corn industry. With the changed philosophy of the Canadian Wheat Board and the increased production of U.S. corn he suggested the Ontario corn grower could be facing 10 lean years, after having had 10 fairly good years.

The Futures Market for corn was then discussed by Robert S. Tebbutt, of Merrill Lynch, Pierce, Fenner and Smith of Toronto.

Dr. Glenn Russell, Director of the Harrow Research Station explained the role of research in the corn industry and how research needs are recognized and acted on.

Dr. Bruce Hunter, Crop Science Department of University of Guelph shared his thoughts on the future of corn in Western Canada. Mr. John Curtis, Director of O.D.A.F. Soils and Crops Branch, gave his analysis of the shape of things to come in the corn production business of Eastern Ontario and Eastern Canada.

The question of market information was treated by Mr. Herbert C. Heimbecker from "the Trade" point of view, and by George Morris from the Growers' point of view. Prof. T. K. Warley gave the conference summary and his implications of the points raised. A final panel addressed the question of "Where do We Go From Here?"

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Dr. Kenneth Pretty, President of the Potash Institute of Canada gave the report of the Recommendations Committee. It contained these thoughts:

A. The creation of an Ontario Corn Council, Ontario Corn Advisory Committee, or similarly designated body which represents all stakeholders in the Ontario corn industry including producers, handlers, shippers, and users of Ontario corn. This Committee should also represent research agencies and government departments concerned with the production and utilization of Ontario corn. A permanent secretariat which includes a designated corn commodity specialist is visualized.

B. The conduct of feasibility studies and investigation of the requirements for additional storage facilities and changes in existing freight rates to ensure continuity of supply and/or improved competitive position to such markets as Eastern Canada, and off shore. Such studies should include all methods of transport, and possible requirements for additional terminal elevator facilities.

C. Immediate support for representations already initiated by other organizations or agencies to increase the amount of storage at elevator point in corn producing areas of Ontario by means of:

(1) accelerated depreciation allowances on new or expanded drying and storage facilities.

(2) the provision of long-term, low interest loans for the construction of such facilities.

D. Market penetration for Ontario corn on a continuous basis

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into the Maritime market is contingent on the availability of freight rate assistance on a basis equivalent to that enjoyed by Western grains (or the elimination of the existing assistance on Western grains). It is recommended that such equivalent status be pursued with considerable vigor.

E. Improved information and education programs are needed in order that Ontario corn producers may make rational decisions on the orderly marketing of this crop commensurate with maximum returns. Although information concerning the quantities and qualities of corn likely to be required by various users (referred to earlier) is a definite need, day to day data on average prices at major receiving areas, factors determining price, the significance of futures trading as a factor in market stability, and any other information pertinent to the marketing function, are additional needs for corn producers.

Both federal and provincial governments should improve their statistical reporting services to quickly provide data pertinent to the corn industry.

The recommendations were referred back to the Conference Steering Committee for follow-up action. The Steering Committee subsequently met with the Hon. Wm. A. Stewart, Ontario Minister of Agriculture and Food, asking that he establish a Corn Industry Council. A recent announcement indicates that this has been accomplished with the members of the Council being -

Chairman - Kenneth Patterson, R. R. #2, Kerwood

Secretary - Morris Huff, Ontario Food Council

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Members - E. M. (Ted) Jones, St. Clair Grain and Feed
Neil Williams, Winchester - farmer
Henry Pearson, Comber - farmer
Colin Ferguson, Elgin - farmer
George Morris, Kent - farmer
Bill Timmis, Seagrams, Waterloo
Don Ross, Canada Starch, (Montreal)
Neil Armstrong, O.F.A., Peel - farmer
Herb Heimbecker, Toronto - broker
Don Hart, Oxford, Woodstock - farmer
Bill Hobbs, U.C.O., Toronto

NITROGEN FERTILIZATION OF CORN AS RELATED TO LEVELS OF MANAGEMENT

C.K.Stevenson, P.Ag., Soils Division,
Ridgetown College of Agricultural Technology,
Ridgetown, Ontario

Nitrogen is the nutrient that usually must be applied to corn in higher amounts than any of the other essential elements. There are two main reasons for this: 1) corn is a member of the grass family of crops which require large amounts of nitrogen, and 2) nitrogen cannot be built up in soils like phosphorus and potassium, therefore fairly high amounts must be applied annually for corn.

Unlike phosphorus and potassium, there is no nitrogen soil test for predicting the nitrogen-supplying power of soils and the amount of nitrogen fertilizer required for optimum crop yields. Soil potassium and part of the soil phosphorus is in the soil minerals, and reliable soil tests have been developed which will predict fairly accurately the phosphorus and potassium-supplying power of soils. However, nitrogen in the soil is largely in the soil organic matter. The nitrogen is made available to plants by bacteria in the soil, however, the rate and amount of release is dependent on many factors in the soil such as pH, temperature, moisture content, aeration, etc. Because of these variable factors it is very hard to predict ahead of time in the laboratory the amount of nitrogen likely to be released the next growing season.

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Nitrogen Recommendations

In Ontario, nitrogen recommendations for crops are based on our knowledge of the crops' needs plus our understanding of the amount of nitrogen likely to become available to the crop from such sources as legumes and manure.

On July 2, 1971, the following changes in the nitrogen requirement were made for corn:

1) No additional nitrogen allowance for rotting corn stover or grain straw.
2) The basic recommendation of 90 lb. nitrogen per acre was changed to 100 lb. (increased to 120 lb. on October 12, 1971).
3) A recommendation for adjustment of the nitrogen rate for yield potential was added.

Table #1 shows the old and new nitrogen recommendations for corn.

Table 1. Nitrogen Recommendations for Corn

	Nitrogen (lb/ac)		
	Total Required Where No Residues Returned	Total Required Where Residues Returned Before Planting	
		Corn Stalks	Grain Straw
Old Recommendation	90	140	120
New Recommendation (effective Oct. 12, 1971)	120	120	120

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Table 1 (Cont'd)

The nitrogen requirement for corn is for a 100 bu/ac yield. It should be adjusted upward or downward 10 lb. of N for each 10 bu. your yield potential differs from 100 bu. For example, the requirement should be reduced 10 lb. of N for a 90 bu. potential, or increased 20 lb of N for a 120 bu. potential. Potential is that yield which from experience, you expect from your soil, climate, and management. Nitrogen requirements for corn should not be adjusted for residues plowed down.

Research Results

The R.C.A.T. Soils Division has conducted nearly 40 field trials during the period 1962-1970 at different locations in the counties of Essex, Kent, Lambton, Middlesex, and Elgin, to evaluate the response of corn to nitrogen application.

Table #2 gives a brief summary of the results.

Table 2. Optimum Nitrogen Rates for Corn, RCAT Trials 1962-1970

Soil management conditions under which trials were conducted		lb. N required per bu. corn obtained*
(a) No legumes plowed down or no manure applied	- ave. all trials (25)	1.14
	- ave. trials on clay soils (17)	1.19
	- ave. trials on sandy soils (5)	1.15
(b) Legumes plowed down and/or manure applied	- ave. all trials (8)	0.41

*based on optimum or most profitable yields

The new nitrogen recommendations which call for 120 lb. N/ac. for 100 bu./ac. yield (= 1.20 lb. N required per bu. corn obtained) where no legumes are plowed down or manure applied are largely

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based on these research results as well as results from the Woodslee Research Station. The above results also indicate the reduced nitrogen fertilizer requirements where legumes are plowed down and/or manure is applied immediately before corn is grown. The new soil test recommendations still make allowance for reducing the nitrogen fertilizer requirement where legume sod is plowed down or manure is applied.

WEED CONTROL IN CORN: 1972-19??

Dr. W. J. Saidak, P.Ag., Herbicide Specialist
Research Station, Harrow

Weeds are one of the main limiting factors in corn production in Ontario. The wide diversity of weed species prevalent in our province is in part responsible for this problem. In addition, the enormous capacity of our weed species to rapidly adapt to shifts in environmental conditions, cultural practices and herbicide usage has also added to the problem.

The importance of weeds as a major factor in corn production is well illustrated by data from the C.D.A. Substation at Woodslee for the period 1968 to 1971. The experiments were located on a Brookston clay loam soil with a population of annual broadleaf and grass weeds which included foxtail, barnyard grass and witch grass. An average annual yield loss of 89 bushels per acre was recorded for corn which was exposed to weed competition for the entire growing season. Mechanical cultivation reduced this yield loss to 40 bushels per acre. The use of 2, 4-D further reduced the yield loss to 29 bushels per acre indicating the importance of controlling annual grasses to obtain maximum corn yields. Yields were reduced by 7 bushels per acre following atrazine application and by 4 bushels per acre following an atrazine with alachlor (Lasso) application showing that a few annual grasses which escape treatment can lead to a yield reduction. All yield losses in these experiments were based on comparisons with plots hand weeded for the growing season.

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Our 1971 research was highlighted by the following results:

1. Preplanting S.6176 gave weed control similar to that provided by atrazine with butylate (Sutan).
2. Preemergence Monsanto 097 showed more activity as an annual grass herbicide than alachlor.
3. Postemergence atrazine with alachlor in an oil-water emulsion gave promise for a reduction in herbicide rates.
4. Atrazine in an oil-water emulsion gave much more rapid initial weed kill than either oil-surfactant concentrate or surfactant alone.

Corn growers will note that Outfox will be a new recommendation for the postemergence control of annual weeds included in the 1972 edition of O.D.A.F. Publication 75, Guide to Chemical Weed Control. The other changes of interest will be a range of rates recommended for the atrazine with alachlor mixture based on the clay content of the soil and a revival of the atrazine with linuron (Lorox) mixture.

Weed research has allowed us to make giant strides in improving weed control for corn in the past 25 years and in the future advances of a more limited nature should be expected. Many tough problems remain but significant gains are visualized. New problems will constantly arise as shown by the recent discovery of a Johnson grass species in Essex and Kent counties and tuberous vetchling in Lambton county. These problems will require detailed studies of weed biology and herbicide mode of action to provide practical control methods. The herbicide recommendations of the

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future will have to be tailor-made for the weed population in each field with herbicide costs based on economic return expected. Ultimately, we will have to solve the problem of weed seed dormancy to ensure that weeds will have no economic impact on corn production.

CORN DISEASE AND INSECT SITUATION

--- PAST AND FUTURE ---

Dr. Bart Bolwyn
Horticulture & Biology Division
R.C.A.T., Ridgetown, Ontario

A review of insect and disease problems in last year's corn crop is fairly simple, but to forecast exactly what will happen in 1972 requires a crystal ball far better than gypsy models available today. This does not mean that we are completely in the dark about the future. We know that there will be smut in the corn, that there will be some leaf blights, and we expect to end the season with stalk rots in several fields. We know that the root worm and the corn borer will be back again.

Survival of disease and insect pests depends on the weather, a factor beyond our control. Farm management, however, is in our own hands. We do have a choice in what crops to plant, where and when to plant them, and when and how to achieve pest control. That choice is our crystal ball. If we choose to the best of our ability, if the choice is based on our experience and on the information available, if - in short - we're "on the ball" we need no gaze at it.

What, then, have we learned from our experience with diseases and insects, and what information do we have to make decisions concerning our next crop?

Southern corn leaf blight hit hard in the United States corn belt in 1970 but reached Ontario too late to do much damage. Last

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year the threat of this disease was a major cause for concern in S.W. Ontario, for we knew that the fungus had survived the winter in corn debris and that we would have to use many seed lots containing the T-type male sterility factor.

Southern leaf blight was found in dozens of fields, especially near elevators and corn cribs, evidence that the blight organism had also over-wintered in infected ears. That the disease did not develop and spread rapidly was due mainly to the extremely dry weather.

In the meantime seed corn companies have produced seed without the male sterility factor so that most, if not all, of the seed sold in Ontario this spring will give us a crop highly tolerant to southern leaf blight. For your protection the seed companies again have agreed to tag their bags with the N, T, or B label.

Yellow leaf blight was first noticed in several areas of Ontario in 1969. This disease does not spread over great distances, but local outbreaks can be severe during wet growing seasons. Other factors which contribute to yellow leaf blight are high plant population (competition and poor air circulation), nitrogen or potassium deficiency, poor soil structure, water logging (poor drainage), or any other factor that places corn plants under stress. A plant under stress is a weak plant and more susceptible to diseases than a vigorous one.

Susceptibility to yellow leaf blight is also tied up with T-type male sterility and is controlled also by producing corn

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seed by the detasseling method. We expect to have no problem with yellow leaf blight this year.

Northern corn leaf blight can become locally severe in the northern part of the corn belt, including Ontario, during humid and wet growing seasons. The time when the disease first appears depends on weather conditions. In some years it may be found before silking. Under less favourable conditions - such as hot, dry weather - there may be very little of it. The earlier the disease appears the greater the damage, not only in decreased yield, but also as a contributing factor to stalk rot.

The northern leaf blight fungus overwinters in the debris of an infected crop left on the soil surface, from where spores are blown into the new crop. These spores can ride on the winds over a great distance.

Northern leaf blight is most effectively controlled by planting resistant hybrids. Resistance is usually greatest in the hybrids with the largest number of resistant inbreds in their make-up. Corn breeders already have incorporated resistant inbreds into today's commercial hybrids. Hybrids with a much higher level of resistance can be expected in the near future.

Stalk rots are becoming the most serious and widespread diseases of field corn in Ontario. These rots are encouraged by the same management practices aimed at higher yields.

Stalk rot losses are increased by continuous corn, minimum tillage, use of susceptible hybrids, high plant populations, damage to stalks and leaves from other diseases, insects, hail,

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etc., high nitrogen levels (particularly on soils low in potassium), and by letting the corn stand in the field after it is mature.

The following practices will reduce losses due to stalk rots: crop rotation (soybeans, where possible), sanitation (plow down all corn debris to hasten decay), plant hybrids with strong stalks at no more than the recommended populations (particularly if a field has a history of stalk rot), choose a full-season hybrid suitable for your area (earlier maturing hybrids are generally more susceptible to stalk rots), have a balanced fertilizer program (based on soil tests), and harvest as soon as the crop is mature (stalk rot organisms thrive on dead or dying stalks).

Stalk rot problems are more closely related to management practices than any other disease of corn. Consider this when planning your next crop.

Corn rootworm damage generally was light in 1971. In fact, since 1968 there has not been a particularly bad rootworm situation, with the exception of some areas where control measures were required.

The best, cheapest, and most strongly recommended control of rootworm is crop rotation. Apply a chemical only after determining for yourself thst it is needed. Having corn continuously in the same field is not reason enough to apply an insecticide. Use the guide lines given in the O.D.A.F. Factsheet entitled "Northern Corn Rootworm" or in the "1972 Field Crop Recommendations" to decide whether or not you should use a chemical

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control the following year. In other words: dig for rootworms and look at root damage the last week of July or first week in August 1972 to decide if a chemical control is warranted in 1973.

European corn borer problems last year generally were less than in 1970. Why? We never really know which of nature's factors has the greatest single effect on corn borer population and activity.

Today's hybrids are more resistant to the corn borer than the open-pollinated lines of years ago. We are, however, experiencing an increase in second-brood larvae which attack the ears, a situation that has been slowly developing for the last 20-30 years. Good control of the first brook would redice the second brood. At the moment there is no economical control of corn borer in field corn. Chemical control is not recommended unless at least 70% of the plants in the entire field have feeding damage in the leaves before tassels appear in the whorls.

GRAIN CORN PRODUCTION COSTS AT DIFFERENT MANAGEMENT LEVELS, AND LAND VALUES

Allan Fisher
Economist, O.D.A.F.
Chatham, Ontario

Most Ontario producers wish to harvest 100 bushels or more of corn per acre. Efficient production of a 100 bushels or over corn crop is profitable only when a quality product is sold at a price above all production costs. Production costs are moving up rapidly, and increased yields are necessary to cover these costs.

In order to obtain high yields, the grower not only requires favourable weather conditions and a productive soil, but must have the management ability to combine together all the factors of successful corn production. Potential corn yields vary from area to area and from farm to farm within any area. When a farmer is establishing his corn yield goal, he should take into consideration the potential and limitations of his soil, and his ability to manage the crop for a high yield.

In some areas, lower corn prices have meant that it is difficult for farmers to realize a profit on high value land. Farm land values usually are not established by the productivity of the soil but by farmers who purchase farms for expansion, anticipation of higher yields and prices, and other personal reasons.

To illustrate the effect on net returns of low and high land values combined with average and above average management levels, some budgeted corn production costs were prepared.

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COST FACTORS

The following cost factors were used to set up and make the comparisons on page A-15.

(1) Two values are used for land - \$350 per acre and \$700 per acre.

(2) Two levels of management are used - AVERAGE and ABOVE AVERAGE (has 20% more yield per acre)

(3) Time to produce one acre of corn - 5.4 hours.

(4) Labour is valued at \$1.75 per hour for average management and at \$2.00 per hour for above average management.

(5) Seed fertilizer, weed sprays, etc. vary as shown in Table 1.

(6) Machinery costs include tractors, plows, corn pickers, combines, planters, cultivators, sprayers, harrows etc. and are valued at \$19.00 per acre.

(7) Storage on the farm is charged at 3¢ per bushel.

(8) Trucking of corn is charged at 6¢ per bushel.

(9) Land charges are interest on investment at 8% plus taxes.

(10) Other overhead covers interest on operating capital etc.

(11) Gross returns - two corn price levels used, \$1.15 and \$1.25 per bushel.

(12) Net returns - amount left to allow for risk in growing the crop, debt retirement, and for farm growth.

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Grain Corn Production Costs at Different
Management Levels, and Land Values

Land Value	Low		High	
Management Level	Average	Above	Average	Above
Av. yield/acre	80	96	100	120
Labor (5.4 hours)	9.45	10.80	9.45	10.80
Tractor & machine	19.00	19.00	19.00	19.00
Custom work	4.80	5.52	6.00	6.90
Materials				
Seed	4.50	6.00	4.50	6.00
Fertilizer	16.00	19.20	16.00	19.20
Spray (weeds)	5.00	6.00	5.00	6.00
Other	1.00	2.00	1.00	2.00
Total material	26.50	33.20	26.50	33.20
Storage on farm (@ 3¢ per bushel)	2.40	2.88	3.00	3.60
Land Charges				
Interest @ 8%)	28.00	28.00	56.00	56.00
Taxes	7.00	7.00	10.00	10.00
Other overhead	2.00	3.00	2.00	3.00
TOTAL COSTS PER ACRE	99.15	109.40	131.95	142.50
Gross returns (if corn $1.25)	100.00	120.00	125.00	150.00
Net returns	.85	10.60	-6.95	7.50
Gross returns (if corn $1.15)	92.00	110.40	115.00	138.00
Net returns	-8.00	1.00	-16.95	-4.50

THE SQUEEZE ON CORN STORAGE IN ONTARIO

G.W. McNern, General Manager
Norfolk Cooperative Co. Ltd., Simcoe

The lack of sufficient storage for corn at the local grain elevator or on [illegible] prices for corn at harvest time.

To properly understand some of the problems due to the lack of storage we should look at some of our total production figures for all grains, at what storage space is presently available and the volume of grain being put on the market during the harvest rush.

The following chart shows what has taken place in grain production and in particular the great increases in the production of grain corn. Presently about [illegible] in the Southern Counties.

Grain Production - Ontario 1961-70

Year	Winter Wheat	Oats	Barley	Rye	Mixed Grains	Soy-beans	Shelled Corn	Total
	(million bushels)							
1970	15.6	46.0	17.9	1.7	53.3	10.4	93.5	238.4
1969	14.3	44.9	15.7	1.6	50.0	7.7	69.8	204.0
1968	14.9	61.0	16.3	1.4	50.8	9.0	78.5	231.9
1967	15.5	61.4	13.2	1.3	45.5	8.1	72.2	217.2
1966	15.0	62.2	11.2	1.3	40.9	8.9	64.8	204.3
1965	13.0	81.0	9.6	1.3	48.3	8.0	59.7	2[illegible]0.9
1964	18.0	83.6	6.3	1.4	43.5	7.0	52.7	212.9
1963	17.6	88.6	4.5	1.5	41.8	5.0	36.0	195.0
1962	15.7	102.7	3.6	1.5	41.7	6.6	33.3	205.1
1961	19.9	92.8	3.3	1.5	38.0	6.6	29.1	191.2

Local Grain Elevators: (Country Elevators)

There are about 105 country elevators in Ontario, having as their prime function that of receiving grains from producers, conditioning, storing and marketing. There are wide variations in the storage and handling capacities of local elevators. Storage capacity in these elevators has at least tripled in the last ten years but has still not kept up with production increases.

Country Elevator Storage Capacity
By Region and County

Region & County	No. of Elevators(1)	Gross Capacity	Work Space ('000 bus.)	Effe Capa
Brant & Haldimand	3	360.0	32.0	3
Elgin	12	2,894.5	252.3	2,6
Essex	15	1,724.0	132.3	1,5
Kent	34	5,844.9	622.8	5,2
Lambton	9	678.8	180.0	4
Middlesex	11	1,371.2	207.0	1,1
Norfolk	4	603.0	123.0	4
Oxford	4	529.8	81.1	4
Southern Ontario	92	14,006.2	1,630.2	12,3
Bruce & Huron	5	1,515.9	51.6	1,4
Perth & Waterloo	3	419.5	31.5	3
Western Ontario	8	1,935.4	83.1	1,8
Durham, Northumberland and Ontario	3	53.3	9.5	
Central Ontario	3	53.3	9.5	
Dundas & Grenville	2	125.0	45.0	
Eastern Ontario	2	125.0	45.0	
Total Province	105	16,120.0	1,767.7	14,3

(1) Counties with only one elevator were combined with results of neighbouri counties to preserve the confidentiality of individual replies.

The swing in crop production from crops like oats to corn is very signi to a local grain elevator. Receipts of oats, barley, rye and mixed grains a elevators and mills surveyed in 1970 totalled only 7% of the 1969-70 average production whereas receipts of corn were 55%, soybeans 92% and wheat 76% of 1969-70 average production.

Total receipts of all grains at country elevators in 1970 totalled 62.3 million bushels. This represents about 30% of the total production.

Southern and Western Ontario produce about 80% of the Ontario productio The elevators in this area handled 99% of the total grain marketed in the pr through the elevator system.

There are certain times of the year when the local elevator system is over worked. In 1970, 50% of all elevator receipts were in a three month period, October to December, 29% were from July to September leaving 21% of the total receipts in six months. About 62% of the corn marketed through the elevator system is marketed in the October-December period.

It was found that 94.3% of our local elevator capacity was being used for storage at December 1 of 1970, whereas, on July 1, 1970 total inventories were only 29.3% of total capacity. In areas where local elevators accept producer grain for storage for later sale, much of the inventory held in elevators is producer-owned grain. On January 1, 1971, 48.2% of the inventories of all grains held by elevators in Southern Ontario were producer-owned grains. This ran as high as 55.5% in Kent County.

Feed Mills and Feed Manufacturing Plants - these plants process livestock feeds from grains received directly from producers, primary elevators or other outside sources. Most feed plants maintain a minimum of storage capacity at their plants. The total gross capacity of grain storage space available at feed manufacturing plants is about 6.0 million bushels with an effective capacity of 5.0 million bushels. The greater portion of this capacity or 2.8 million bushels was at plants in Western Ontario.

Storage at Industrial Plants - a separate survey of industrial plants, distillers, starch plants and breakfast food manufacturers revealed that total inplant storage of the industry located in Ontario amounts to about 2 million bushels. Many of these manufacturers rely upon the country elevator storage while some maintain stocks in terminal elevators.

Terminal Elevator Storage - additional storage space is available at terminal elevators located on the Great Lakes, Georgian Bay and along the St. Lawrence. Some of this space is used for storage of wheat for export or for milling by flourmills located adjacent to these ports. However, it is generally considered that these terminals are not well located for the storage of Ontario-produced corn.

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COMPETITIVE FEED GRAIN RELATIONSHIPS

F. J. Archibald, General Manager
Western Ontario Grain Operations
Maple Leaf Mills Ltd.
St. Clair Grain & Feeds
Chatham, Ontario

The feeding value of Ontario and American corn of like quality is the same. It is a simple calculation to find the dollar value of Ontario corn in relation to American corn.

Take the value of American corn f.o.b. an American port.	$______
Plus duty	.08
Freight from American port to a Canadian port including tolls and elevation into the terminal elevator.	______
Plus or minus American funds.	______

This gives you the value of American corn laid down in a Canadian port. From this you subtract the freight from that port to the country shipping point and the dealer's handling charge and this should be the value of Ontario corn to the Ontario farmers. This is an over-simplification of the relationship of the price of American corn and Canadian corn, but the basic assumptions are sound.

You do get variations in freight rates, and in the cash premium or discount at various parts in relationship to the Chicago market, and unfortunately there has been a bad deterioration in the value of the American dollar in relationship to the Canadian dollar which very adversely effects the price of Ontario corn.

In the fall when we have a surplus of corn in Ontario trying to find a market we must compete with American corn in the Montreal market. During times when there is a shortage of Ontario corn we

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might compete with the American laid down price at Woodstock or London or some inland points which would be much more advantageous from an Ontario point of view.

We probably will have to compete in export markets if we develop a surplus of corn in Eastern Canada. As soon as we do this, however, we lose the 8¢ duty placed on American corn coming into Canada and therefore our price could deteriorate immediately by 8¢ per bushel. There has been some small lots of Ontario corn exported at advantageious prices because of various factors such as boats looking for cargoes, government programs, Cuba, etc.

During the fall of 1971 there were large quantities of corn rushed to the market by Ontario farmers with the result that prices deteriorated below the equivalent of American laid down price, Montreal. There is a real question now as to whether Eastern Canada is in a deficit or surplus position on corn. If we are in a deficit position, it is certainly not advantageous to have corn rushed to the market in such quantities that buyers are able to drive the price down below the cost of American corn to the detriment of the Ontario farmer.

It is obvious that more storage is required so that corn does not have to be sold at distressed prices. It is my opinion that there are only three logical places to build storage for corn. They are:

1. On the farm;
2. At the country elevator;
3. At the place where the corn will be used.

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If corn is stored at any other location, for example a terminal elevator, substantial extra charges are incurred such as elevation in and out, out of line haul, and stop-off charges by the railway. I am sure that a terminal elevator would have to be subsidized as it would not make money in my opinion.

ONTARIO CORN VS. WESTERN FEED GRAINS

Here are some of my thoughts on the use of grains in livestock feeds. When one considers grains, that is, corn versus western wheat or barley one has to consider the class of livestock that one is working with.

Let us first consider the high energy feeds such as broiler and turkey feeds. In this case the number one item is energy, and in ranking the grains we would rank corn, wheat, barley and oats in that order on a per pound basis. Therefore, if corn and western wheat are the same price, corn would be selected in a higher energy feed because it contains more energy per pound than does wheat. The price you pay for corn is considerably more than that for barley. One also has to consider other sources of energy such as animal fat, and if the animal fat is cheap then it means that barley is more competitive with corn since an animal fat-barley combination can equal corn on an energy basis.

The second main consideration would be protein and ranking the importance you would place approximately 60% to 70% of the nutrient values on energy and 20% and 30% on protein. So therefore we consider energy 3 to 4 times as important as protein in grain.

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When one considers protein in grain then one has to relate the price of soybean meal as opposed to protein in western wheat or barley, both of which are higher in protein than corn.

For early growing animal feeds which have a higher amino acid requirement it is often more economic to bring the amino acids in from soybean meal or fish meal, which are relatively rich in these amino acids, asoopposed to having wheat which is in a high protein grain but relatively poor in these essential amino acids. I am going to present you a table that we did some time ago in running various grains through the computer on a medium energy feed such as a chick grower.

RELATIVE VALUE OF WHEAT AND BARLEY WITH CORN AND SOYBEAN MEAL AT DIFFERENT PRICES

Dollars per 100 Pounds

Soybean Meal	Corn	Wheat	Barley
$5.10	$2.30	$2.62	$2.27
	2.50	2.79	2.43
5.50	2.30	2.66	2.32
	2.50	2.84	2.46

Relative values determined by use of equations developed by Dr. S. J. Slinger based on the method suggested by Maryland group.

In this table we compare the relative value of wheat and barley with corn and soybean meal at different prices. Note in this table when soybean meal is at $5.10 and corn at $2.30, wheat is values at $2.62. Now if the price of corn goes up by 20¢ a hundred to $2.50, that the value of wheat is only increased by 17¢

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to $2.79. In these examples we can afford to pay more for wheat than we can for corn because energy is not as high and therefore less pressure on energy. Note also that if soybean meal goes from $5.10 a hundred to $5.50 a hundred that wheat is only increased in value by 4¢ a hundred, from $2.62 to $2.66.

If you go into more factors this gets more complicated and that is the reason why nutritionists use computers.

If we consider feeding cattle, then crude protein will not have as much importance as it does for poultry or for swine. For example, we can increase the protein content of a ration from 12% to 16% more economically with the use of non-protein nitrogen sources such as urea than we can be using soybean meal. Also feeding a 12% beef cattle finisher ration there is less pressure on protein and therefore the cost of grain is probably more important than its energy or protein content. In fact if one considers depression in butter fat tests, a ration containing some barley is actually more beneficial to a dairy cow than a ration with all corn because of the fibre content of barley.

This is not an easy subject to discuss in general terms since we have specific feeds for specific classes of livestock. A general substitution of one pound of grain for another does not work and one will not get the same results.

It is very difficult to answer all the questions on wheat and barley vs. corn in a general way.

I can assure you that while feed nutritionists are very price conscious, they realize that corn is the highest energy grain and is an excellent feed. They prefer to use corn if the price is competitive.

REQUIREMENTS OF QUALITY CORN

D.A. Ross, Vice President
Canada Starch Co. Ltd., Montreal

The assignment that was given to me today was to speak on "The Requirements of Quality Corn". Of course, anyone buying or using corn wants to get the highest quality that he can possibly get, but there is a limit to what can be provided of the highest quality corn and also a limit that can be paid for this type of corn.

It is my understanding that certain industries - and I believe the distilling industry may be one - feel that it is beneficial for them to pay a premium for corn which might come under the category mentioned above in that it would be extremely high in test weight, have no damage or very little damage, be completely naturally dried, etc. I believe too that there may be some corn grinding companies who are willing to pay a slight premium for corn of this same quality because they think that in grinding this type of corn there is greater economic advantage to them than paying a lower price and getting a lower quality corn.

I suppose that there is only a certain quantity of this high quality corn that is available at any one time. If the demand for this type of corn increases, I believe it is logical to expect that the premium that would be paid to get it could increase.

As far as our own company is concerned, we, of course, want to get the highest quality corn that we can possibly get, but we do not feel that the premium that might have to be paid to get high quality corn has the same economic advantage for us that it may have for other companies or industries. We therefore prefer to buy on the basis of No. 2 Yellow Corn and our experience

has been that on that basis over all we receive an average quality that is certainly higher than the minimum standard required to meet the No. 2 basis. I must admit that in buying in this fashion we at times receive corn that is high in damage and low in viability.

Up until 2 years ago, most of our corn was shipped in from the United States, but in the last two years approximately 90% to 95% of the corn that we have used has come from this area. This of course is due to the fact that the corn acreage has increased a lot and that the availability of corn is not quite as erratic as it used to be in the past.

Our policy has been to have in storage at Cardinal or at the Prescott Elevator at the close of navigation enough corn to carry us through to the opening of navigation. We have adopted this policy because as I said earlier, the supply factor in the past has been rather erratic, and we have not felt that we could depend on regular supplies coming in for instance by car during the winter months. It is quite possible that in the future the supply situation may enable us to depend on this area for shipments during the winter months, but then again this would mean that a greater amount of corn would have to be stored in this area over the winter months and already storage facilities are taxed to the limit.

Let me tell you a little bit about what is developing in Eastern Ontario where an increasing amount of corn is being grown. Quite honestly we have hoped that Eastern Ontario might be a supply area for corn for our Cardinal plant. However, we have found that up to this point the corn that we have taken in has not been suitable. The reason for this I believe is that some of the corn has not been physiologically matured, has not been dried properly nor have they learned how to handle it as you have in this area. I think

that progress is being made in all these areas, and we are hopeful that some time in the not too distant future Eastern Ontario will provide quality corn that will be suitable for our use. Already of course most of it is going to the feed trade but some has gone to the distilling industry and this year a small amount was made available for export.

It is certainly the intention of The Canada Starch Company to buy as much corn as we possibly can in Canada, but we expect to buy this corn and land it at our plant at a price that is equal to or less than what it would cost to bring in U.S. corn. We believe that this price policy is a reasonable one because it is our view that the Canadian farmer producer is as ingenious, is as up to date and is as good a businessman as his American counterpart.

SEED QUALITY AFFECTS EMERGENCE OF CORN

W. T. Bradnock
Biologist-In-Charge of Seed Germination & Physiology
Canada Department of Agriculture, Ottawa

Corn growers in southern Ontario precision sow evenly-spaced single seeds in early May. For maximum yield they require every seed to germinate and produce a plant. After sowing germination may be delayed by cold wet conditions or by soil compaction. After such conditions in some seed lots not all seeds eventually germinate, resulting in gaps in the rows. The corn growers requested the Canada Department of Agriculture to develop a test which would predict more accurately than the standard germination test under ideal conditions which seed lots would germinate under stress conditions. It was thought that a "cold test" in unsterilized soil might be the answer but this has proved unsuitable because results are not reproducible. It was found that corn seeds die in cold wet soil because they are invaded by fungi which rot them. Seeds which have been mechanically damaged in shelling are particularly vulnerable, especially when the damage occurs at the crown of the seed away from the embryo. Such damaged seeds will germinate readily under the sterile conditions of the standard germination test but in soil, substances in solution leach out of the seeds and may stimulate fungal invasion. Such seeds are most likely to succumb to fungi when prevented from germinating by low temperatures. Since the mechanical damage which causes seed leaching is usually readily apparent on visual examination of the

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seeds, one way of removing from sale seed lots of poor potential for stress conditions would be to downgrade lots containing more than a certain percentage of damaged seeds. This idea is being further investigated. Under soil compaction some seedlings still emerge while others leaf out under the soil and never produce normal plants. The possible relationship of this problem to seed quality, variety and to growing conditions is still being studied.

CALCULATE YOUR OWN CORN HARVESTING COSTS

P. H. Bomford
Engineering Division, R.C.A.T.

Machinery costs constitute just about one quarter of the costs of growing and harvesting a crop of corn - on average $15.00 - $20.00 per acre. A recent publication entitled, "Farm Machinery Operating Costs" from the Farm Economics, Co-operatives and Statistics Branch of ODAF puts forward an updated and simplified plan for calculating farm machinery costs, and it is this plan that I will recommend to your attention.

For the purpose of cost calculations, farm machines are divided into three groups; Tractors, which are assigned a 10-year life

Group I Machines (10-year life), comprising all complex machines such as combines, planters, etc. and

Group II Machines (15-year life), comprising simpler machines such as plows, wagons, elevators, etc.

Each of these groups is assigned a Basic Hourly Rate, based on first cost and annual hours of use. Table 1 shows the Basic Hourly Rates for the three groups of machines. From this table, the basic hourly rate of any machine can be determined, if the number of annual hours of use is known. Where a used machine has been purchased, the price to use is half way between the original new price and the purchase price actually paid for the machine.

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Next the fuel and lubricants cost must be added in. Table II uses two pieces of information - fuel cost and fuel consumption to arrive at an hourly cost for fuel, lubricants and filters. Lubricants and filters are taken to be worth an additional 15% of the actual fuel cost.

To show how harvesting costs are calculated, here is an example.

Example

Corn is being picked with a 2-row picker at 1½ acres per hour.

2-row corn picker	- new cost	$2400.00;	annual use 200 hours
70 HP tractor	- new cost	7500.00;	annual use 950 hours
3 V-box wagons	- new cost	600.00;	annual use 200 hours
40 HP tractor	- new cost	4300.00;	annual use 600 hours
Elevator	- new cost	700.00;	annual use 300 hours

Fuel - 5 gallons per hour - 70 HP tractor

1 gallon per hour - 40 HP tractor

¼ gallon per hour - elevator

Fuel at 27¢ per gallon

Labour - 2 men at $2.00 per hour each

Hourly Costs:	70 HP Tractor	75 x 2.3¢ = $1.72
	40 HP Tractor	42 x 3.1¢ = 1.30
	2 row corn picker	24 x 12¢ = 2.88
	3 V-box wagons	18 x 12¢ = 2.16
	Elevator	7 x 11¢ = .77

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Fuel & lubricants (from Table II)	=	$ 1.9
Labour	=	4.00
Total		$14.77 per hour
Cost per acre at $1\frac{1}{2}$ acres/hr		$ 9.85

This compares quite well with the latest available custom rates for corn picking, at $9.00 per acre not including an elevator. However, it will be seen that the two highest machinery cost items are for the corn picker and the three wagons, which have the least annual use. Perhaps the wagons could be given more use for hay or forage hauling for a neighbour. There could also be some custom work to spread the cost of the picker over more acres.

To sum up; every businessman must know his costs of production if he is to remain competitive. Farm machinery costs are no exception to this rule. The method that I have outlined is not complicated, and will give quite accurate results, on which future planning can be based.

TABLE I

BASIC HOURLY RATE, FARM MACHINES[a]
(Machines purchased new)

Tractors (10-year life)		Group I Machines (10-year life)		Group II Machines (15-year life)	
Annual use	Basic rate /$100 new	Annual use	Basic rate /$100 new	Annual use	Basic rate /$100 new
hours	cents	hours	cents	hours	cents
200	7.4	25	65	25	59
225	6.7	30	55	30	50
250	6.1	35	48	35	43
275	5.7	40	42	40	38
300	5.3	45	38	45	35
325	5.0	50	35	50	32
350	4.6	55	32	55	29
375	4.4	60	30	60	27
400	4.2	65	28	65	26
425	4.0	70	26	70	24
450	3.8	75	25	75	23
475	3.7	80	23	80	22
500	3.5	85	22	85	21
525	3.4	90	21	90	20
550	3.3	95	20	95	19
575	3.2	100	20	100	18
600	3.1	110	18	110	17
650	3.0	120	17	120	16
700	2.8	130	16	130	15
750	2.7	140	15	140	15
800	2.6	150	14	150	14
850	2.5	175	13	175	13
900	2.4	200	12	200	12
950	2.3	225	11	225	12
1000	2.2	250	11	250	12
1200	2.1	275	11	275	11
1500	2.1	300	11	300	11
1600	2.0	350	10	350	11
1800	2.0	400	10	400	11
2000	2.0	500	10	500	10

[a] Add fuel costs where applicable

TABLE II

OTHER COSTS, FARM MACHINES
(Fuel, oil, grease, filters)

Price of fuel per gallon[a]	.20	.21	.22	.23	.24	.25	.26	.27	.28	.29	.30	.31	.32	.33	.34	.35	.36	.37	.38	.39	.40
Fuel per [illegible]	Cost per hour (fuel + 15%)[b]																				
.25	.06	.06	.06	.07	.07	.07	.08	.08	.08	.08	.09	.09	.09	[illegible]	.10	.10	.10	.11	.11	.11	[illegible]
.50	.12	.12	.13	.13	.14	.14	.15	.16	.16	.17	.17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
.75	.17	[illegible]	[illegible]	[illegible]	[illegible]	.22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1.25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1.75	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.52	.54	.56	.58	.60	.62	.64	.66	.68	.70	.72	.74	[illegible]	[illegible]	[illegible]
2.0	.46	.48	.51	.53	.55	.58	.60	.62	.64	.67	.69	.71	.74	.76	.78	.81	.83	.85	.87	.90	.92
2.25	.52	.54	.57	.60	.62	.65	.67	.70	.72	.75	.78	.80	.83	.85	.88	.91	.93	.96	.98	1.01	1.04
2.5	.58	.60	.63	.66	.69	.72	.75	.78	.81	.83	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2.75	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.90	[illegible]	[illegible]	[illegible]	1.04	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

a Prices per gallon for fuel are net at the farm (without tax)

b 15% = allowance for oil, grease, and oil filters

How to use this table: 1. A new tractor uses 1.5 gals. of fuel per hour to perform a certain task

2. Net cost of fuel at the farm is 30 cents per gallon

PROBLEM: To find total other costs per hour for tractor read down first column at lefthand side of page to fuel consumption of 1.5 gals. per hour and then across the page to price of fuel at 30 cents per gallon column and you get 52 cents as cost per hour for fuel, oil, grease, and filters

ON FARM STORAGE STRUCTURES AND COSTS

January 1972
R. E. Clayton, P. Eng.
Agricultural Engineer
Ontario Department of Agriculture & Food
Extension Branch - Ridgetown

INTRODUCTION

At the recent Ontario Grain Corn Industry Conference, the marketing of cash grain corn was discussed. Three avenues are available: a) by marketing directly as a cash grain crop for feed manufacture; b) by marketing indirectly through owned livestock; (both methods competing with the western grain available in Ontario) or c) by concentrating efforts to capture the industrial market. Feed grain consuming animals are declining in Southwestern Ontario and consequently the ability to market the grain grown to livestock is not great. Marketing cash corn directly places the producer in competition with western feed grains and imported corn. The latter method of marketing appears to be the more logical for a cash corn producer.

The Special Committee on Farm Income (1) in 1969 reported estimated usable "on farm storage" capacity for corn as shown in the following table for the five counties of Southwestern Ontario.

Table I

Corn Production, Estimated Farm Storage Capacity; and Licensed Elevator Capacity By County

County	Corn Production - Bushels	Estimated on-Farm Storage-Bu.	Licensed Elevator Capacity-Bu.	Total Storage for Corn Available
Essex	7,347,600	3,088,287	1,050,000	4,138,287
Kent	19,000,000	11,480,300	3,653,000	15,133,300
Lambton	5,942,700	2,499,255	450,000	2,949,255
Middlesex	8,650,000	4,108,217	1,158,000	5,266,217
Elgin	7,413,700	3,389,914	[illegible]	[illegible]
Totals	48,354,000	24,565,973	7,364,000	31,929,973

(1) "The Corn Industry in Ontario" - A Report by the Special Committee on Farm Income in Ontario, July 1969, Page 30.

...continued

From the above table it appears that total storage available - both on the farm and in the elevator - is approximately 66% of the crop production. On-farm storage accounts for approximately 51% of the total production.

THE COST OF ON-THE-FARM CORN DRYING AND STORAGE

From several studies of corn drying installations in Southwestern Ontario in 1969 and 1970 by the author and others it has been found that Figure 1 - first presented at Farmers Week in 1967 [(1)] gives a reasonable estimate of the probable annual cost for drying, handling and storage when the initial or capital cost for a drying, handling, cleaning, and storage facility has been estimated. New "turn-key" systems erected under contract at the present time will cost from $0.75 to $1.25 per bushel depending upon the physical requirements. Interest has been shown as ?% at the present time as this item is a variable and can alter the total cost. Overhead costs for this chart do not contain values for change and/or additions in the electrical service if necessary; annual tax under the Assessment Act; wet holding bins, aeration costs or other accessories; and grading of the site if required.

To use the chart for estimating your annual drying, handling, and storage costs enter the chart assuming a capital cost e.g. - 75¢ per bushel.

a) Accept 7.5¢ as the cost for drier operation.

b) For interest at [illegible] find that interest line indicates a total annual cost of 11¢ i.e. 11 - 7.5 = 3.5¢/bu. for interest charges.

c) Assume 10 year depreciation: find that total cost is 18.5¢/bu. i.e. 18.5 - 11 = 7.5¢/bu. for depreciation allowance.

d) If the drier operation costs can be reduced through automation or personal resourcefulness to say 4¢/bu. then the total costs at 75¢/bu. capital cost would be:

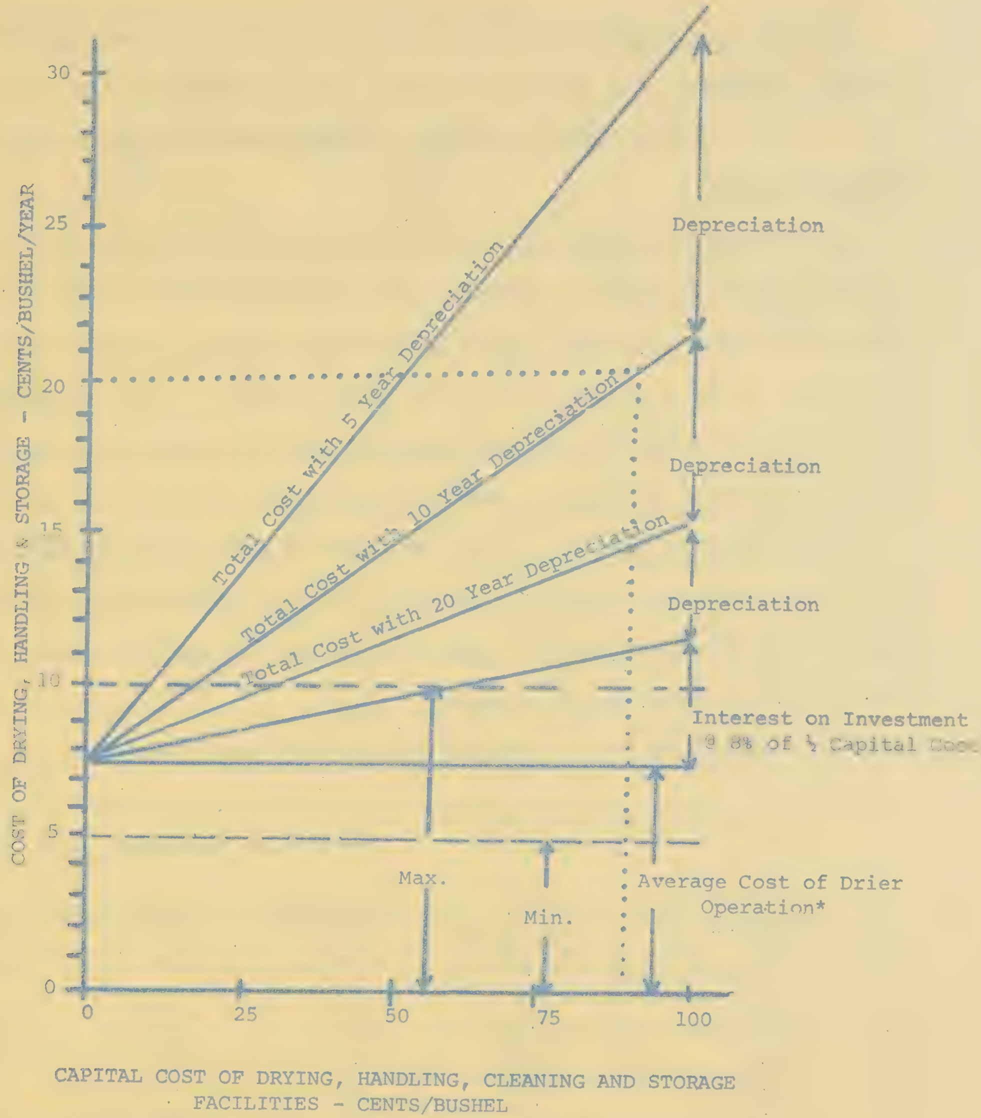
would be:	Operation	4¢
	Interest	3.5¢
	Depreciation	7.5¢

Total estimated annual cost = 15¢/bu. for drying, handling and storage.

(1) "Corn Drying and Storage - [illegible] and Costs" - [illegible] Winfield, P. Eng., Farmers Week 1967 - interest rate changed 1971

...continued

FIGURE 1. - THE COST OF ON-THE-FARM CORN DRYING AND STORAGE



*Cost of drier operation should include; burner fuel; fuel for tractor or electricity for motors; drier repairs; allowance for tractor depreciation and repairs (if used); and a labour charge for attending the drier.

In order to compare systems the entire costs should be considered from harvest to storage - and in some instances - e.g. livestock on farm use - the cost of removal from storage, handling, processing and conveying to the livestock.

OVERDRYING COSTS!

On-farm drying systems often dry the corn below the standard 15.5 percent moisture content in order to lessen the anticipated moisture problem found in large grain masses. However, unless the producer arranges a special price for his product at the lower moisture content when marketed he will lose money using the standard bushel weight and by additional fuel costs in drying - and this is the hardest moisture to remove by drying!

If the standard bushel 56 lb. at 15.5 percent moisture is assumed (47.32 lbs. of dry matter per bushel) by calculation one can determine the actual weight at low moisture contents required to deliver the same dry matter i.e. 47.32 lbs. Table "II" gives the details.

TABLE II - Loss of Value in Overdrying for Varying Market Price

			Your Loss for Market Value of: (3)		
M.C.	Wt. to give Standard Bu. (1) - Lbs.	(2) Difference Lbs./Bu.	Corn $1.10/bu. 1.97¢/lb. ¢/bu.	Corn $1.20/bu. 2.15¢/lb. ¢/bu.	Corn $1.30/bu. 2.32¢/lb. ¢/bu.
14.0	55.30	0.7	1.4¢	1.5¢	1.6¢
13.5	54.98	1.02	2.0	2.2	2.4
13.0	54.66	1.34	2.6	2.9	3.1
12.5	54.35	1.65	3.2	3.5	3.8
12.0	54.04	1.96	3.8	4.2	4.5
11.5	53.74	2.26	4.4	4.9	5.3

1) Derived from standard calculations shown in "How Your Shelled Corn is Bought" Ontario Department of Agriculture & Food, September 1970 and included the invisible loss.

2) Difference - Standard bushel weight (56 lbs.) minus "Weight to give standard bushel" at the moisture contents shown.

3) Your loss - due to low moisture content (from a drier or a crib) unless you bargain for a drier product (low moisture content should give a high "test weight" since kernels have shrunk and will require less space for each kernel)

...continued

Fuel costs to dry at low moisture contents can be estimated at 1¢ per bushel per 1% of moisture content reduced. Thus the fuel cost/bu. to over dry is: down to 14.5% moisture content - 1¢/bu.

down to 14.5% moisture content	- 1¢/bu.
13.5%	- 2¢/bu.
12.5%	- 3¢/bu.

The total cost for overdrying to 13.5% moisture content is 2.4¢ + 2¢ = 4.4¢/bu. No allowance had been made for the time loss. Aeration equipment is more economical to own and operate than the cost noted above.

Corn Cribs

In the last three years contracted costs for corn cribs have varied between 44¢ and 48¢ per shelled bushel for a 7 ft. x 18 ft. on a concrete slab floor, with wire fabric without a roof. Since the wall construction and bracework used is similar for other widths from 5 ft. to 8 ft. it follows that the total cost will be proportional to the volume of the crib. Thus 6 ft. wide cribs would likely cost 50 to 56¢ per bushel and 8 ft. wide cribs would cost 38 to 42¢ per bushel (18 ft. height without roof). Depending upon the roof design and labour required to construct same, costs can be 10 to 15¢/bushel for a roof.

High Moisture Corn Storage

When the corn grown on the farm will be fed to livestock on the farm then the high moisture storage systems must be considered. For a livestock owner uncertain of the future, "acid treated" corn can have short term advantages in that capital is not spent in erecting permanent structures. However, economies of labour and financing can be obtained in permanent high moisture storage and processing systems for those livestock owners with long term livestock interests. Examples of costs for high moisture shelled corn storages are given in Table III.

...continued

TABLE III

Cost Comparisons for High Moisture Storage (1)

Silo Type	Capacity-bu. (dry)	Capital Range Cost/bu.	Annual Cost/bu. including estimated loss
A/ Sealed			
Glass-lined Steel	11,470 - 12,340	$1.15 - $1.40	$0.13 - 0.16
Galvanized Steel	13,340	0.80 - 0.85	0.10 - 0.11
Concrete	12,000	0.35 - 0.55	0.10 - 0.13
B/ Not Sealed			
Galvanized steel bin with coating for "Acid-treated" corn	12,500	0.35	0.22 (included cost of acid @ 18¢ per bu.)
Galvanized steel bin for dry corn	12,500	0.30	0.04

Summary

1. All the alternatives and the future goals of the landowner must be considered before investing in unnecessary or superfluous permanent assets.

2. Investment in harvesting and transport equipment should be made with the future goal in mind. Similarly, choose suitable storages for the anticipated end use.

3. Each landowner has different goals and management abilities - thus each must define the economical system for that goal and management.

(1) "The Storage of High Moisture Corn" - H. E. Bellman, P. Eng., ODAF, Walkerton; January 1971.

SUMMARY

SOUTHWESTERN ONTARIO FARMERS' WEEK
AT
RIDGETOWN COLLEGE OF AGRICULTURAL TECHNOLOGY

BEEF and DAIRY PRODUCTION
Thursday January 13, 1972

ONTARIO DEPARTMENT OF AGRICULTURE & FOOD
PARLIAMENT BUILDINGS, TORONTO

EVERETT BIGGS/DEPUTY MINISTER   HON. WM. A. STEWART/MINISTER

FOREWARD

The Southwestern Ontario Farmers' Week is a result of the deliberations of many individuals beginning in early October. Most segments of the agricultural community of Southwestern Ontario are represented with the emphasis on the farming sector.

The sessions containing discussion on current topics of interest to many people are repeated each day so that as many as possible may participate. A summary of each presentation is contained in this booklet. It is hoped that this information will be of use to each and every farmer interested.

Among the organizations responsible for the planning of the 1972 Farmers' Week are:

- Soil and Crop Improvement Associations, Milk Committees and Beef Improvement Associations of the Counties of Essex, Kent, Lambton, Elgin and Middlesex
- Kent Vegetable Growers' Association
- Essex Vegetable Growers' Association
- Ontario Bean Producers' Marketing Board
- Ontario Soya-bean Growers' Marketing Board
- Ontario Department of Agriculture and Food
- Harrow Research Station (Canada Department of Agriculture)

We, at the Ridgetown College of Agricultural Technology, are pleased that the planning committee has seen fit to make use of the facilities available here at the College.

If farmers should want to contact research personnel at the Harrow Research Station, or the Ridgetown College of Agricultural Technology, the staffs of both stations are listed with the specific area in which they conduct research.

Harrow Research Station

Canada Department of Agriculture

Department and Personnel	Area of Research
CHEMISTRY AND WEED SCIENCE	
Dr. G.M. Ward	Head of Section Greenhouse vegetable crops. Nutrition, production, biochemistry of tomatoes and cucumbers.
Dr. A.S. Hamill	Effect of herbicides on weed species and weed population shifts, influence of weed competition on crop yields.
Dr. P.B. Marriage	Herbicide physiology and persistence.
Dr. W.J. Saidak	Weeds, weed control, herbicide evaluation and herbicide translocation.
Dr. F.G. von Stryk	Pesticide chemistry. Residue analysis, systemic insecticides, fungicides, herbicides.
CROP SCIENCE	
C.G. Mortimore	Head of Section Corn breeding, stalk rot research, agronomic studies.
L.J. Anderson	Variety testing of corn, soybeans, and cereals.
Dr. J.W. Aylesworth	White bean breeding and production practices.
Dr. B.R. Buttery	Soybean physiology and biochemistry.
Dr. R.I. Buzzell	Soybean breeding and genetics, agronomic studies.
W.A. Scott	Burley tobacco management.
ENTOMOLOGY	
Dr. C.D.F. Miller	Head of Section Cereal and forage crop insects (Cereal leaf beetle - Alfalfa weevil)
Dr. W.M. Elliott	Vegetable insects (peach aphid, Myzus persicae) on potatoes.
Dr. W.H. Foott	Field crop and vegetable insects (Corn leaf aphid - Sap beetle)
Dr. R.P. Jacques	Insect pathology. (Cabbage looper - cabbageworm)
Dr. P.W. Johnson	Plant parasitic nematodes. (Root-knot nematode - lesion nematode on greenhouse vegetables)

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Department and Personnel	Area of Research
Entomology - continued	
Dr. R .J. McClanahan	Greenhouse insects. (Two-spotted spider mite - greenhouse whitefly, integrated control)
H.B. Wressell (Chatham)	Field crop and vegetable insects. (Insects on white beans, corn and tomatoes)
HORTICULTURAL AND SOIL SCIENCE	
Dr. J.M. Fulton	Head of Section The water requirements of crops, soil moisture, irrigation, evapotranspiration.
Dr. E .F. Bolton	Soil physics, cropping systems, cultivation, tillage, soil aeration and drainage.
Dr. W.I. Findlay	Soil fertility maintenance, build up and decline; crop fertilizer requirements, and time of application.
Dr. R.E.C. Layne	Tree fruit breeding. Winterhardiness. Disease resistance. Peach rootstocks.
V.W. Nuttall	Vegetable breeding. Genetics. Greenhouse and pickling cucumber breeding.
Dr. H.A. Quamme	Tree fruit breeding. Fireblight resistance of pear. Cold-hardy dwarfing rootstocks for pear.
PLANT PATHOLOGY	
Dr. C.D. McKeen	Head of Section Greenhouse and field vegetable diseases. Verticillium wilt. Evaluation of fungicides on vegetables.
Dr. B.N. Dhanvantari	Tree fruit diseases. Peach canker, bacterial leaf spot of peaches and apricots. Crown gall.
Dr. John Dueck	Bacterial diseases of fruit and vegetable crops. Fireblight of apple and pear. Bacterial spot of pepper
Dr. L.F. Gates	Corn root and stalk rot and other corn diseases. Viruses of cereals and legumes.
Dr. J.H. Haas	White bean and soybean diseases. Bacterial blights, bronzing and root rots.
Dr. R.N. Wensley	Soil microbiology. Fusarium wilt and root rot diseases of melons, asparagus and other vegetable crops.

Ridgetown College of Agricultural Technology
Ontario Department of Agriculture and Food

Department and Personnel	Area of Research
AGRICULTURAL ENGINEERING	
P.H. Bomford	Head of Department. Corn and Soybean harvest losses. Grain drying systems.
R.E. Clayton	Extension engineer (Kent County) in farm buildings, farm drainage and farm machinery.
M. Sojak	Environmental control (ventilation). Drainage systems (durability of plastic drains and drain maintenance. Specialized machinery.
BIOLOGY AND HORTICULTURE (and weed control)	
R.H. Brown	Head of Department. Evaluation of chemical weed control in corn, burley tobacco, asparagus, red beets, tomatoes and strawberries. Control of Quackgrass and fall panicum.
Dr. B. Bolwyn	Insect and disease control in corn (Northern corn blights, rootworm) white beans (white mold).
J.K. Muehmer	Variety evaluation and production techniques in processing crops (sweet corn, tomatoes, peppers, cucumbers).
J.E. Shaw	Evaluation of chemical weed control in soybeans, white beans, kidney beans, lima beans, cereal grains, alfalfa, cucumbers, potatoes. Control of velvetleaf, Jimsonweed, and Black Nightshade.
CROPS	
A.D. McLaren	Head of Department. Variety evaluation and production techniques in corn and forages.
R.C. Jenkinson	Variety evaluation and production techniques in cereals and winter wheat and spring wheat.
D.A. Littlejohns	Variety evaluation and production techniques in soybeans and white beans.
A.K. Brooks	Extension in Crop Production - Middlesex and Elgin Co.
W.W. Parks	Extension in Crop Production - East Kent and Lambton Counties.

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Department and Personnel	Area of Research
FARM MANAGEMENT AND ECONOMICS	
D. Beattie	Head of Department, Farm management and productio[n] economics of livestock.
S.J. Usher	Marketing agricultural products, agricultural policies, economics in swine production.
LIVESTOCK AND POULTRY	
D.G. Luckham	Head of Department. Nutrition and egg production feeding broiler hatching flocks.
J.E. Core	Beef and Dairy rations. Stored feeding programs including stover silage, silage additives.
A.A. Campbell	Chemical components of feed.
J.R. Morris	Selection of swine breeding stock, herd health. Evaluation of additives (protein supplements, antibiotics.) Feeding of high moisture corn stored with organic acid to finishing hogs.
SOILS	
Dr. C.S. Baldwin	Head of Department. Plastic coated corn and spring wheat, nitrogen in spring wheat and white bean production.
R.W. Johnston	Calcium, magnesium, and micronutrients in field crops (corn, soybeans, white beans, and forages).
C.K. Stevenson	Evaluation of nitrification inhibitiors in the nitrogen fertilization of corn. Soil fertility maintenance, time of application of fertilizers.
VETERINARY SERVICES LABORATORY	
Dr. F.J. Harden	Head of Department. Assistance given in diseases of all classes of livestock.
Dr. R.E. Clugston	Assistance given in diseases of all classes of livestock.
Dr. D.A. Stevenson	Assistance given in diseases of all classes of livestock.
AGRICULTURAL LABORATORY TECHNOLOGY	
Dr. J.H. Brimner	Coordinator of course, chemical components of crops and feeds.
AGRICULTURAL SECRETARY	
R.C. Wagner	Coordinator of course. Farm accounting and agricultural policy.

T A B L E   O F   C O N T E N T S

BEEF CATTLE (Buff) — Page

A. WHY NOT PRODUCE CALVES IN SOUTHERN ONTARIO?
- -David Beattie — A1
- -P.A. (Lex) Rutherford — A5
- -Harvey Blackburn — A10

B. WHAT KIND OF CATTLE SHOULD I FEED? (Panel)
- -V.J. Kaufman — B1
- -Donald McDiarmid — B1
- -D.C. Iler — B3
- -R.P. Miller — B5
- -George Morris — B7

DAIRY MANAGEMENT (Pink)

A. WHY DAIRY?
- -H. VanderPol — A1 - 6

B. WHY PROVE DAIRY SIRES
- -Dr. M.G. Freeman — B1 - 5

C. FEEDING FOR PROFITABLE MILK PRODUCTION
- -Dr. J.T. Huber — C1 - 6

FEEDING AND MANAGEMENT (Golden Rod)

A. CATTLE DISEASES
- -Dr. F.J. Harden — A1 - 6

B. FARM MANURE AND CORN PRODUCTION
- -Dr. C.S. Baldwin — B1 - 6

C. CORN PLANT POPULATION FOR SILAGE
- -David Beattie — C1 - 5

* * * * * * * * * * * * *

F E A T U R E (Yellow)

"SILAGE ADDITIVES FOR BEEF AND DAIRY CATTLE"
- -Dr. J.T. Huber — 1 - 7

CALF PRODUCTION IN SOUTHERN ONTARIO

David Beattie
Ridgetown College of Agricultural Technology

It is a common belief that we cannot afford to produce our own beef calves in Southern Ontario. For some inexplicable reason the farmer and his advisors have concluded that calves should only be produced in Western Canada or Northern Ontario where there are plenty of wide open spaces and a strange breed of people willing to exist on a very low income.

Ontario agriculture is based on the livestock industry -- certain small areas of the Province have established sound, specialized cash crop systems of farming yielding high rewards, but in general most farmers even in this county recognize that cash cropping of grain corn and beans can be a hazardous occupation, if one intends to make a reasonable living.

It surprises me that the Ontario Farmer is willing to give up an enterprise such as the cow-calf operation to the Western Farmer who is also a very large competitor in feeding out calves. We may not be far away from the situation where the Ontario feedlot operator cannot compete with the Westerner ___ the beef industry is moving to the West. This doesn't make a great deal of sense since the population centres of Canada are mainly in the East ___ unless the Western Ranchers have a secret formula for producing calves considerably cheaper than we can produce them here.

A comparison of some of the factors involved in rearing calves between Ontario and Western Canada may throw some light on the situation as it is at present.

Western Cow-Calf

Extensive type of production - 15-30 acres of land required/cow

Land values are low - $20/acre in common value

Winters are very cold - high maintenance costs for cows and/or high bodyweight losses

Weather seriously affects calving percentage - 75% of calving is common

Herd size is large - may be the only enterprise

Southern Ontario Cow-Calf

Intensive type of production is required - 1-5 acres land/cow

Land values relatively high - $100-500 range

Winters not too severe - maintenance costs lower than in West

Calving Percentage - should not be affected by weather and 90% or better should be achieved.

Head size - medium to small as a secondary enterprise.

- or large and intensive if we get organized.

That sounds pretty good, it becomes obvious that if the above statements are true then we ought to be able to produce calves cheaper than the Western Rancher. The next question then is "What kind of return should we expect on the cow-calf operation?"

Example:

Suppose we start with 10 crossbred cows.

Purchase price of 10 crossbred heifers @ \$350 each = \$3,500.

The heifers are then bred and calve on the average about 10 months after purchase.

16 months after purchase we have 9 calves to sell

9 calves @ 400 lbs at 40¢ per lb return \$1,440.

Costs of keeping a heifer for 16 months (until calf is sold) can be calculated as follows:

Summer feed (2 acres good pasture @ \$20/ac. for 2 yrs)	- \$ 80.00
Winter feed (1½ tons hay @ \$20/ton)	- \$ 30.00
Housing and bedding	- \$ 10.00
Veterinary supplies	- \$ 5.00
Breeding charge	- \$ 5.50
Power, fuel and depreciation	- \$ 5.00
	\$ 135.50
Interest on capital (8% on \$350 invested in cow)	- 35.30
Total costs for 1 cow for 16 months (except labor)	= \$ 170.80
Total costs for 10 cows for 16 months (except labor)	= \$1708.00
Total returns on calves	= \$1440.00
Net loss	= \$ 268.00
2nd Year Costs (approx.) for 10 cows	= \$1280.00
2nd Year Returns (9 calves, 400 lbs each @ 40¢)	= \$1440.00
Net Return to labor and management	= \$ 160.00

cont'd

At current market price and with good management returns could be considerably higher:

Example 2:	50 cows valued @ $350.00/head	= $17,500.00
	Annual costs for 50 cows ($120.00/head)	= $ 6,000.00
	Returns from 48 calves (450 lbs @ 45¢/lb)	= $ 9,720.00
	Net return to labor and management	= $ 3,720.00

This type of return per year could be achieved with 50 or 100 and perhaps 200 or more cows per year.

Use of corn silage and crop by-products such as corn stover can quite feasibly reduce feed costs even further. Minimal housing or shelter is required in this part of Ontario. Current year prices for calves were closer to 50¢/lb and will probably stay that way for some time because of the economics of feeding very cheap barley in the West.

Borrowing money to establish a cow herd is feasible but the operation will not generate <u>cash</u> for several years - however, you will be increasing your equity via the money you have in the cows.

Southern Ontario can produce large quantities of feed on a per acre basis such as corn silage or haylage which will allow us to compete with Western Farmer on a cost basis - and beat him. We waste millions of tons of feed such as corn stover each year, our pastures are pathetic - lacking in fertilizer and good grazing management.

We cannot afford to raise calves in Southern Ontario in the future if we use the techniques of the past, but there are distinct possibilities in the cow-calf business for those willing to invest their money and follow through with top quality management.

WHY NOT A CONFINEMENT COW-CALF ENTERPRISE?

P.A. (Lex) Rutherford
Live Stock Branch
Ontario Department of Agriculture & Food
Toronto, Ontario

When Capital costs get high enough that a product can no longer compete, it is the inventors and inovators who see this not as a disaster but as an opportunity. The stress of the situation spurs them on in their creative venture. South West Ontario beef calf production may have reached this stage.

There is an old adage "Every beef animal starts as a cow and calf on grass". This is no longer entirely true. The majority of our beef calves may always come off of grass - but the innovation of confining cows in a small yard is upon us. It is no longer a dream. It has now been accomplished.

One herd of cows in Texas has now been confined for over 10 years. The cows have remained healthy, however as was expected, a mineral deficiency showed up in about the 8th year and there were many weak calves. By more adequate supplementation, this situation was rectified.

Here is a comparison of their production - with a similar herd on pasture:

	Confined	On Pasture
Original Cows - 1959	36	36
Cows - 1970	22	20
Cows that died	1	7

	Confined	On Pasture
Performance - 10 Calf Crops:		
Calves weaned	83%	88%
Birth weights	68.8 lbs.	73.5 lbs.
Weaning weights	472 lbs.	474 lbs.
Net return over feed and pasture		
Low energy ration	35.13	48.90
high energy ration	25.96	46.12

It was suggested that with semi-confinement there could be a savings of $10 to $15 per cow:-

Results would then be about	$50.00	$49.00

on the low energy ration.

The above figures are based on feed and pasture costs only. If we consider land costs at present values in South West Ontario, the confined or semi-confined program may be very competitive with the pasture type program. However, the real question is will it compete with other enterprises? Will it actually pay?

The University of Illinois has had a confined beef herd for about seven years. The confined cows have maintained their weight well and the conception rate on natural breeding has been higher than on pasture. Confined calves have been heavier at weaning than the pasture calves.

Dr. Albert of the University of Illinois claims that 100 bushel corn land can carry 2½ cows per acre when the corn is used as corn silage. He hopes to increase the carrying capacity

to four cows per acre, weaning a 500 pound calf from each. This will be accomplished, he hopes, by a modified cropping system involving corn silage, corn grain and corn stover. At that level of production he feels it would compete with the corn silage feeding operation with 1000 pounds of beef produced per acre.

In Minnesota, Drs. J. C. Meiske and D.R. Goodrich believe they can double the land carrying capacity by confining the cows.

Another factor to consider in confining a cow herd is artificial breeding. One commercial operator claims he gets 70% conception on first service and a 92 to 93% calf crop. These results suggest management ability much above the expected average, but set a goal to shoot for.

Problems reported to date from confinement operations are conditions such as mineral deficiencies and scours. It would appear that a new management technique is required to overcome such problems.

While we have not found all the answers to management and while the economics have not yet been proven, confinement of beef cows may offer opportunities to some.

Paul Marion at the Livestock Research Station at Spur, Texas, where the longest research project on confinement is still operating, doesn't think 100 percent confinement is the answer - he favours use of some pasturing when possible.

Most changes in production technique have both disadvantages and advantages. A confinement Cow-Calf operation is no exception in this regard.

DISADVANTAGES

1. More labour
2. More exacting management
3. Closer and more constant supervision which would tie the operator down.
4. Potential nutritional problems
5. Increase in disease potential especially in calves.

ADVANTAGES

1. Less investment in land per cow-calf unit.
2. Potential of increasing herd on limited land resource.
3. Possibility of reducing some climate and weather hazards.
4. Encourages and permits closer observation of breeding herd for such things as culling and selection.
5. Facilitates the keeping of more adequate and accurate performance records.
6. Closer observation should result in early diagnosis, early treatment of sick and reduced losses.
7. Artificial Insemination in the beef herd would be made more practical.
8. Confined calves will wean more easily with less weaning stress, shock and set back and will start on a finishing ration more quickly.

9. A Confinement cow-calf program may lend itself to intergration with a feedlot operation thus allowing a top notch cattle breeder to further benefit from the fruits of his endeavour.

Confinement cow-calf operations shall be tried. Some may be successful. For some who know what they are doing, and whose circumstances are suitable, confinement or semi-confinement of the beef cow herd may offer a real opportunity.

It must be emphasized that while there is adequate knowledge of many of the production aspects, there are still many unanswered questions concerning the economics of such an enterprise. It must be able to compete with other enterprise opportunities on a farm. The economics result as in all other farm enterprises will depend on the total management skill of the operator.

To date we do not have sufficient economic data on this enterprise for conditions in South Western Ontario. The figures provided above are too sketchy and there is inadequate detail. However, with present cost price relationships in the beef industry, it seems reasonable to expect that someone will test the possibilities of confinement or semi-confinement cow-calf operations in this area.

WHY NOT PRODUCE CALVES IN SOUTHERN ONTARIO?

Harvey Blackburn
R. R. #2
Uxbridge, Ontario

Mr. Chairman, fellow beef producers. Thank you for the opportunity to join in your beef program.

We farm 496 acres in Ontario County, Northeast of Toronto. 150 acres is in cedar swamp- not very productive, 150 acres in rough improved pasture, 165 acres in corn, and the balance in hay.

We started with a purebred Angus herd purchased from my father's estate. In 1958 we started crossbreeding. The cross that worked out best for us was using a part Charolais, part Angus bull on the Angus cows. This gives us a calf with a high percentage of Angus and small percentage Charolais blood. In 1970 we imported some Red Angus from Wyoming, and have been using Red Angus on Angus Charolais cross heifers.

Ridgetown is where the program we are using originated. I attended an August program to hear Mr. Garst from Coon Rapids, Iowa several years ago.

On the same program Jim MacDonald was deploring the wasted corn stalks that could be used to provide cheap feed for beef cows in this part of Ontario. We went home and decided to change our cow-calf-finishing program to a straight cow-calf operation and increase our 100 cow herd. We planned on using stover as the main winter feed, but in 1969 we were too late harvesting, and had to pasture the stalks.

By February 1, the snow crust was too much for the cows and we continued with hay for the rest of the winter.

This was a very economical feed, but we wondered what we would have done if the snow had come six weeks earlier.

In 1970 we harvested 166 acres and put most of the stover in an old gravel pit near where the cows wintered in the bush. The balance put about fifteen feet in a 24x80 silo. Our reason for this was to save time feeding. This was almost a disaster. The corn spoiled and froze on top and would not feed down in the self feeding wagons. The loader picked up dirt and wasted more feed. Snow blew into the pit and had to be cleaned out before feeding. Add to this the discomfort of driving a crawler about two miles each day with no cab, and you can understand why we did not like it. The stover ran out in mid-Feb. and the cost of hay for the rest of the year was about 3000 dollars. The pit wasted enough to feed another six weeks.

This year we harvested about 180 acres of stover silage which filled our 24x80 silo and piled 17 loads on a cemented yard. This also fed the cows part time for the month that it took us to harvest. The rest of the time the cows spent cleaning up the field after the harvester and ahead of the plow. Between two-thirds and three quarters of the seventeen loads on the cement yard spoiled and we hauled it back to the bush and piled it to give the cows a warm bed. Another year we would pile it there in the first place and save one move.

We have had our fill of gravel pits and piles as a place to keep stover silage. On December 21, we opened the silo and by December 24, the cows were eating enough of this feed that they could not clean up 8 pounds of hay per day. This has not happened in one and a half years and it says a lot for the palatability of the silage in the tower silo.

The first year on stover in 1969 we had 106 calves from 109 cows - 4 calves died at calving and one cow had twins. The steers sold for 44 cents per pound and weighed 516 pounds at a 7-month average age for $227.00 at the farm.

The second year, 1970, on stover we had 130 calves from 131 cows - one dead at birth, and no twins. The steers weighed 417 lbs. at 7 months average age and brought 45 cents per pound for $187.00 each.

This year we had 160 calves from 161 cows - 3 cows were barren, we lost 2 calves at birth, and had 1 set of twins. The steers weighed 406 pounds at 6 months average age. We sorted out 9 bulls which would have raised the average, and the youngest calf was just a week over 3 months old. We sold on Sept. 1 - too early for the higher prices that followed- for 45 cents, the same as 1970, for $182.00 each.

We hope that our experiences with cows and calves may be of some benefit to you. We do not profess to have all the answers by any means, but we enjoy working with cows and calves and feel this is a pre-requisite for anyone wishing to get started in the business.

Thank you.

WHAT KIND OF CATTLE SHOULD I FEED?

V.J. Kaufman
R.R.#6, Woodstock, Ont.

We like to feed Hereford or Hereford Angus crossbreeds. We start with 400 lb. calves and feed them on a silage ration until they are 1050 lbs. in weight. We sell them direct to the packers on a rail grade basis. I started in the cattle business in the early forties, with 30 head. At that time I finished cattle with grain on grass. Then I tried cutting the grass and taking it to the cattle in a 12 acre lot.

In 1958 I built a 24 x 50 silo and filled it with haylage for 2 years. Then we started growing corn which we are still doing.

WHAT KIND OF CATTLE SHOULD I FEED?

Donald McDiarmid
R.R.#4, Dresden, Ont.

"What kind of cattle should I feed?"

I don't feed choice grades of cattle unless they can be purchased at reasonable prices. Neither do I stay with any one breed of cattle. The cattle I feed are growthy cattle with large bone structures, although they aren't high priced cattle.

When I go to a sale I like to look over the cattle before the sale commences, generally making note of those I am interested in buying. I also make up my mind as to the amount I will pay for them. If you purchase the cattle in small groups of 5 to 12 head at a time, they are generally from 1 to 2 cents a hundred cheaper than buying them in carload lots. When I have purchased my quota, I have approximately 150 Hereford,

50 Angus and the rest are crossbred, including some Holstein-Hereford cross, and some Charolais.

Two men feed cattle for me on their farms and are paid by the gain per lb. One farmer fed 29 Herefords and 11 Charolais cross, averaging 420 pounds, last winter. They were fed corn silage and no grain. Gain averaged 200 lbs. each in 5 months but the Charolais gained 36 lbs. each, more than the Herefords.

The other farmer feeds from 100 to 120 steer calves, grass ensilage with 3 or 4 lbs. of grain corn per head per day added. He also averaged 200 lbs. gain per head in 5 months.

The remainder of the steer calves I feed at home. Last winter I fed grass ensilage and grain corn.

When the cattle are purchased in September or early October, they are turned out to pasture where plenty of water is available and are given salt and mineral. They are observed daily for 10 days to 2 weeks for signs of sickness.

When it comes time to put them in the barn, each one is put through a squeeze and Ruelene is poured on its back, a Stilbestrol pill is put in one ear, and it is given a shot of A, D and E vitamins, pinched and dehorned when necessary.

In the spring, each steer gets another Stilbestrol pill and is sprayed for lice and warble fly. Then they are turned out to pasture on 156 acres of trefoil and timothy grass. The 250 cattle are pastured on 3 of my farms, approximately 50 acres per farm. There is a feeder on each pasture farm in which corn chop is mixed with salt to control the amount eaten by the steers.

In 1968, 1969 and 1970, they gained approximately 300 lbs. per

steer by the end of the pasture season. In 1971, lack of rain in the summer caused the pastures to dry up and my cattle were sold in August with 200 lbs. of gain per steer. Usually 40% of the cattle are sold as fat steers, the remainder are sold as heavy feeders.

In closing my remarks, I would like to emphasize the advantages of finishing cattle on pasture:

1. Lower cost per pound of gain.
2. Less labour costs -
   - no feed handling.
   - no manure cleaning.
3. Lower fixed overhead in facilities.
4. Lower maintenance costs -
   - no hydro costs.
   - no working machinery to break.

WHAT KIND OF CATTLE SHOULD I FEED?

D.C. Iler
Assistant Plant Manager
Canada Packers Limited, Toronto, Ont.

What kind of cattle should I feed?

I would rather change this to read "What kind of cattle does the consumer want?" I am not an expert on what the consumer wants, but I do know what kind of cattle the buyers for the large chains and supermarkets want.

Now I am sure these buyers are trying to buy cattle that will suit Mrs. Consumer. If they were buying beef that did not suit Mrs. Consumer, I am sure they would very quickly change their type to buy.

The kind of cattle they want are:

(1) they want beef produced from a relatively young animal in the 14 to 24 month category.

(2) these buyers want a steer carcass weighing from 550 to 675 pounds hot weight.

(3) they want a good quality carcass with sufficient fat covering so they will hang for approximately 2 weeks and, at the same time, they do not want it over-finished.

(4) the larger supermarkets will take hips and chucks from heavier cattle because most of these are sold in the boneless state. They do not, however, want ribs and loins from the heavier cattle as they produce too heavy a steak. These ribs and loins are ideal for the hotel and restaurant trade.

(5) as far as heifers are concerned, some chains and supermarkets will not buy heifers. The ones that will buy heifers want a smooth fleshy carcass in the 450 to 525 pound weight range. They tell us that heifer carcasses weighing over 525 pounds have a tendency to carry too much finish. The chains and supermarkets will buy heifers only when they can discount them 1 to 1½ cents from steers.

If we are concerned with "meeting customer requirements", I think the one most important item would be the elimination of over-finished cattle. By over-finished cattle, I mean carcasses carrying more than 7/10's of an inch of fat at the rib eye on a 600 to 650 pound carcass.

At the other end of the scale, we have to be just as careful that the carcass carries enough finish and has enough marbling and quality to make it eat properly.

It has been said that the consumer wants a lean carcass of beef

with a large rib eye and minimum fat covering. I think we have to watch that we don't go too far in this direction. We don't want to lean up these carcasses to the point where the eating quality deteriorates as this can soon lead to reduced consumption of beef.

To meet consumer requirements, I think we have to produce a carcass some place in between these minimum finished cattle, as I mentioned, and the over fat cattle.

The preference is for a steer in the 550 to 675 pound weight range and if this type of steer can be produced consistently, I am sure our beef business will continue to prosper.

WHAT KIND OF CATTLE SHOULD I FEED?

R.P. "Dick" Miller
Canada Department of Agriculture
Kitchener, Ont.

The question "What Kind of Cattle Should I Feed?" is a very involved one but the simplest answer is - to feed those that will produce the most profit to the feeder.

About 75% of the cattle coming to market have been raised for beef purposes not necessarily of beef breeding but raised and marketed at a youthful age. The remaining 25% is made up mainly of mature cows and bulls of both beef and dairy type. These then are really a by-product of beef production and milk production.

To date this year approximately 63.7% of all cattle slaughtered have graded "Canada Choice" or "Canada Good". Only a few short years ago (4 or 5) the industry needed about 24,000-25,000 per week; today we are using 34,600/wk. in Canada. Hence it appears as though the demand for

youthful, well-muscled, well-finished quality carcass is there.

The cattle that are in demand are those that the packing houses can readily sell, that is, a carcass weighing from 550-650 lbs., is well-muscled and has a good covering of quality finish. There is no need to over-finish any carcass. Even though an over-fat carcass may bring more dollars per hundredweight, these are a real headache to a beef manager. These over-fat carcasses will yield more weight when dressed and make the live cost per pound look great but when the beef manager has to sell for "fat claims", they turn out to be an expensive exercise.

There is also a limited demand for plainer type cattle by some smaller butcher shops and if you are making money feeding these types I wouldn't suggest changing and similarly I think you should bear in mind the increasing demand for Choice and Good grade cattle. But the main thing to keep in mind is the kind of cattle to feed are healthy, growthy and thrifty.

WHAT KIND OF CATTLE SHOULD I FEED?

George Morris
R.R.#1, Merlin, Ont.

You ask:

What type of cattle should I feed?, and my answer is - only the good type, the type that will gain 4 lbs. a day and make a dollar.

You ask:

What colour will he be? -any colour, maybe, as George Ross said, "he should be green, he might remind me of money".

When I was a boy, the pride and joy of neighbours at the fair, was to have the top rooster. To my amazement, this rooster, when his head came off, had red blood and tasted the same as all other roosters. The pride and joy today with my neighbours, is to top the live cattle market. I stop there. Gentlemen!, this is a luxury I cannot afford.

I keep asking myself this question. How can I up the grade of fancy feeders? It is obvious, the best that I could do is wind up with choice market toppers. There is no advance or appeal to that.

I find the tendency today is to undergrade thin, rough-haired feeder cattle. This is one reason why I can up the grades and have higher net returns for good cattle compared to choice grade. There is another obscure reason worth mentioning. Nature allows for a compensating gain that is never found in fleshy kinds.

Show me a thin 550 lb. rough-haired bull calf at 7 months with a good back, one that is 3 inches too long between the shoulder and the hook bone. This is the calf that has been undergraded and rejected. My gate and my cheque book are always open. Now - show my neighbour the kind he likes - critters with wide muzzles, and matched in colour. Most of the

dwarfy cattle I have seen, and there are many, had a wide muzzle, short legs and short loin; and especially short on returns. Tradition is the greatest stumbling block the feeder has. Most of the lessons in my life, like yours, come the hard way. This is one - let me share it with you. A few years ago I visited the experimental station at Wooster, Ohio. The researchers had 3 herds made up of Herefords, Charolais, and crossbreds. The feeding and grading trials of the steer calves from these herds proved 2 points even to a fool like me. Tradition and daylight under a steer have no value. Thirty-four Hereford carcasses at 538 days of age, weighed 512 lbs. on the average. The 32 Charolais weighed 638 lbs. The average rib eye area for Herefords 9.34 inches, for the Charolais 12.28 inches. The Charolais and crossbreds won every major point on the rail, but they came in second, according to the grader. Gentlemen! the grader is an .... He said "These winners lacked conformation, the loin was 6 inches too long, the leg is 6 inches too long". My prayer should be - please, Lord, cover my plate with that extra large loin steak, that extra 1/4 pound of choice beef. Please fill my yard with the cattle that give 108 pounds more edible portion worth $100.00 at today's prices. The Lord said "Why should I?" It is there for your taking. He that trips over the same stone twice, deserves to break his neck. Gentlemen! these cattle did not come in second at my place; even in a horse race, the horse that gets to the wire first wins, but not with cattle, not the feeders, not the packers. The Lord knows better, the cattle know better.

Let me share another shocker that I got at Michigan State University. These researchers sorted 3 lots of cattle into 3 groups weighing 625 lbs. each. Each group was made up of choice prime, good and

standards. One group was fed regular corn silage that is termed 40-60. The final weight on the coice and prime cattle was 939 lbs. showing a profit over feed of $73.43. The good grade weighed 939 lbs. and their profit was $78.01. The standards which were Holstein weighed 1043 lbs. This profit was $93.28. The second lot were fed 1% shelled corn with the silage. All three grades were equal, profit-wise. The number 3 lot were fed 1½% shelled corn and the standards were only $1.00 per head ahead on this ration. By the acre, then, standard quality cattle fed a silage ration should be $20.00 per head better than their pen mates, even if they have gold teeth. This adds up to d....... expensive loving, and poor company for the fancy cattle and the fancy feed.

When planning my feeding program, the track is crowded and competitive, and feed is my next major cost. I am armed with this knowledge.....one acre or 5 tons of alfalfa hay contain 7000 lbs. of total digestible nutrients, the same amount found in 158 bushels of corn or a little over 5 tons of corn silage. It does not take much gray matter to figure out that my ration will be corn silage and urea. The same weight of gray matter tells me that the undergraded, rejected steer is the dude I should feed. He will be green when he came in, and there will be something green about him when he leaves.

What do we get when we vigorously mix corn silage and undergraded cattle? - success, we hope, and smoke in our eyes from .... Mr. Benson.

WHY DAIRY?

H. VanderPol, B.Sc.(Agr.), M.B.A., P.Ag.
President, Rol-land Farms Ltd.
& Lecturer, Faculty of Business, Univ. of Windsor

There are many factors which influence, mold and direct one's career. These factors combine in such a manner, at a given time and place that the end result is a job, or career if you like. If we are fatalists we chalk up our successes or failures to that charmed little, old "lady luck". If we are objectivists we say yes chance has something to do with it but mainly we control our destiny by setting goals and objectives for ourselves.

One should subscribe to the objective approach to life. We can in fact by planning and directing our efforts in the "proper" direction do just about anything we want. Thinking positively is only a small part of this whole exercise. It, positive thinking, is a tool which can help those with weak constitutions build assurance and self confidence to continue to direct their efforts properly.

With this in mind today let us address ourselves as the title indicate to the topic "Why the dairy business?".

Everyone must have some goals and objectives in life. These can be explicit like becoming mayor of a town or implicit like living well. Many things influence one's goals and objectives as (1) parents
(2) friends
(3) education
(4) upbringing
(5) fellow workers
(6) ethnic origin
(7) religion
(8) experience

Each one of us is subjected to influences from all or part of these. The more important ones influence us more than the less important ones and over a period of time, sometimes short and sometimes long, each individual with the help and guidance of these influencing factors develops a set of goals and objectives.

It is an academic privilege to discuss in generalities. However, it is also one's responsibility and duty to get to the point. The point here being what are some of these so-called goals and objectives. When discussing goals and objectives we mean such things as:

(1) job satisfaction
(2) standard of living
(3) income level
(4) regular hours and leisure time
(5) independence
(6) status
(7) unique opportunities

There are others; however, let's see how dairying fits into a set of goals and objectives. Or perhaps we should look at it from the point of view of what type of goals and objectives must one have for dairying to fit into his future. Because of the fact that by the time most of us are in a position to seriously consider a career or a business venture such as dairying our goals and objectives in life are already quite set or defined.

Let's take the latter approach; that is, what kinds of goals and objectives can one have and live with if he is to remain in or enter the dairy business. Some of these essential

factors are:

(1) a desire to be an independent businessman
(2) a desire to reduce risks due to fluctuating markets
(3) a desire for an acceptable standard of living
(4) a desire to do something which is satisfying - job satisfaction
(5) seizing a unique opportunity to take advantage of trends and conditions in such a manner as to enhance one's long term prospects for the "good life"
(6) a willingness to work long and regular seven day weeks.

Now the author is the first to admit that if these are the only influencing factors one has to go on that there are many other careers and business ventures along with farming which fit the bill.

It is at this point that we should re-address ourselves to thoseinfluences covered earlier. Not only do they influence our goals and objectives but they influence us the person, our habits and our values. It is our value system which ultimately is the deciding factor in how we will achieve our goals and objectives, not the goals and objectives themselves and it is our value system which weighs those unmeasureables like continuing on with tradition, or the family business. It is our value system which says "yes" to the question I'd like to dairy farm, but "no" to the long regular time and effort requirements. It is our value system which says no to the question of will I go into debt to almost the point of no return for twenty-five years to realize "my dream" of being a dairy farmer. And it's our value system which ultimately may be the reason for us not reaching our objectives.

Perhaps the definition of value system used here is slightly unfamiliar. Don't misunderstand it. Not for one moment is there a suggestion of unethical practices. Value system is meant to refer to that set of "things" which helps us directly or indirectly to weigh the pros and cons of the various issues and facts which are part of any decision we must make.

What this all leads us to is why did we get into the dairy business. There are two parts to this question and we'll deal with the personal part of the we first.

What intrigues the author most of all is the way people ask the questions (1) why farming, (2) why dairy farming? It is significant that the only people who ask these questions with a tone of voice which implies a questioning of one's sanity are those who are in the business of farming and dairy farming. Academic and business acquaintances all think it beats teaching and running a business all to you know where. It is fair to say that one could be a little taken back by the apparent negative attitude that our farmers and dairy farmers have towards their own businesses and professions. An outsider might get the feeling that all farmers are poor slaves and why anyone would want to get into such a predicament voluntarily is beyond comprehension.

Well allow me to let you in on a little secret. There are a lot of other people, professionals, workers and teachers who are afflicted with the same sickness of negative thinking

and the "grass is greener on the other side of the fence" syndrome.

It's no wonder that young people don't stay on the farm and continue the family business enterprises. Any one susceptible to the continuous negating influences and statements made by and about farmers can't but help to become somewhat hesitant about the adviseability of growing 95¢ corn, producing $2.65 milk and $25.00 hogs. The only comment to this is that most of it is self inflicted either by being obstinant or through lack of effort. Now, everyone knows there are problems, all kinds of them, but don't think for one minute that farmers are the only ones faced with glutted markets and low prices.

One should subscribe to the philosophy that there are at least as many good as there are bad aspects to any decision to be made and weigh these (good) points as objectively as the bad ones. Moreover we should perhaps work by a basic philosophy that goes something like this. I don't care what the rules of your game are. Set them up as you like. I'll evaluate my ability to play the game according to those rules and if I do I have every intention of winning and as long as they're not changed I'll continue to compete.

Let me in closing tell you why we are in the dairy business and in so doing try to apply the aforementioned philosophy.

All of us enjoy the challenge and conditions that are

inherent in agriculture. We had a unique opportunity presented to us in the form of a basic family dairy farm. Furthermore, our aptitudes are significantly varied to provide coverage of the various areas of endeavour in our operation and somehow we get along.

Back in about 1968 the rules in the dairy game were changed and one rule change which was needed for us to grow beyond the one man show was quota transfers. It's as simple as that.

Without this rule change we couldn't play the game and dairy farming was eliminated as a means of achieving our goals and objectives as a group. This policy change allows anyone in Ontario to get into the most profitable and stable part of agriculture. All that's required is the knowhow to manage physical resources, that is the husbandry requirement and the financial resources to establish an operation of significant size to partake of the economics of scale inherent in the dairy business today. Today the only thing holding back many prospective dairy farmers to be, is their inability to tap financial resources successfully. Todays operations must be large to be profitable. This largeness implies specialization of functions e.g. husbandry (animals and crops) finance and personnel. If these abilities can be bought at a profit or supplied along with other inputs, then there is no place where they can be put to use more profitably and more gratifyingly than in the dairy industry in Ontario today.

WHY PROVE DAIRY SIRES

Dr. M.G. Freeman
Dept. of Animal and Poultry Science
University of Guelph

Several scientific studies support the herdmate-comparison system of proving dairy sires now in use in Canada. But let's take a look at it from a practical breeders standpoint.

The first 100 registered and tested daughters of several well proven bulls were analyzed.

Table 1: Daughters of Raymondale Sovereign Master (plus 2.9 milk) compared to their herdmates.

Lactation Number	Number of Daughters	% To Have Next Lactation	% Above Herdmates	% Below Herdmates
1st	89*	-	(63) 71%	(26) 29%
2nd	68	76%	(41) 60%	(27) 40%
3rd	57	64%	(39) 68%	(18) 32%
4th	44	49%	(27) 61%	(17) 39%

*Eleven daughters not milk recorded until later lactations.

Table 2: Percent daughters plus and minus in second lactations (Raymondale Sovereign Master)

	% of Total	% Plus Second Lactation	% Minus Second Lactation
Plus first lactation	81%	71%	29%
Minus first lactation	62%	19%	81%

Raymondale Sovereign Master's latest sire proof is milk plus 2.9 B.C.A. points, final type rating minus one and mammary system plus 2. In this study, two-year old daughters are compared only with within herd-year-season two-year old herdmates and third and later daughter's

records are compared with their similar herdmates. About 2/3 of his daughters are superior to their herdmates. This superiority exists not only in first lactations, but also for seconds, thirds and fourth (Table 1).

Daughters that were plus to herdmates in their first lactations were given the opportunity for a second lactation [illegible] of the time. Sixty-two percent of the minus first lactation daughters were given a second chance. Only 19% were plus to herdmates. Eighty-two percent of the records following a plus first record were plus for the 44 daughters milked at least 4 lactations. Minus initial records yielded 85% minus following records.

Similar results are listed for Roybrook Revelation, milk minus 3.4, final type rating plus 8 and mammary system rating plus 5.

Table 3: Daughters of Roybrook Revelation (minus 3.4 milk) compared to their herdmates.

Lactation	Number	% To Have Next Lactation	% Above Herdmates	% Below Herdmates
1st	94	-	(35) 37%	(59) 63%
2nd	65	69%	(24) 37%	(41) 63%
3rd	49	52%	(12) 25%	(37) 75%
4th	29	[illegible]	(8) 28%	(21) 72%

Table 4: Percent daughters plus and minus second lactations (Roybrook Revelation)

	% of Total	% Plus 2nd Lactation	% Minus 2nd Lactation
Plus first lactation	77%	48%	52%
Minus first lactation	64%	29%	71%

The results are almost turned around, only 1/3 of the daughters exceed their herdmates. In addition only 64% of the records are plus following a plus first record while 82% are minus following a minus first record.

But do the daughters of plus sires burn out? Actually just the opposite appears to happen (Table 5). Forty-three percent of the plus 2.9 milk sire's daughters are found in the later lactations. The national average and the minus sire are 38% and 34% respectively.

Table 5: Distribution of records by age at calving as percent of the two year old records.

Records	National Average (R.O.P. 1969)	Raymondale Sovereign Master	Roybrook Revelation
Yearling	3%	4%	1%
2-year	100	100	100
3-year	86	79	73
4-year	67	58	63
5-year	51	56	43
6-year	40	40	25
7-year	30	33	29
8-year	20	28	18
9-year	13	22	6
Percent 5-9 years	38	43	34

Tenth and later lactations were not included because of the lack of opportunity for these later records on the part of the two sires reported. From Table 10, we may conclude that the best indicate of how long a heifer stays in the herd is her two-year old production ability.

Cost of Plus Two-Year Olds:

The cost of raising heifers to first calving has been recently estimated at about $340.00. If our aim is to have daughters retained who out-produce their herdmates, then for every three daughters of Raymondale Sovereign Master milk recorded 2 may be expected to be plus. For Roybrook Revelation the prospect is 1 out of 3. Therefore the cost of each kept Raymondale Sovereign Master heifer is $260.00 while the one minus sire daughter kept has cost $320.00 (Table 6).

Table 6: Cost of retained heifers from plus and minus proven sires.

	Raymondale Sovereign Master (+2.9 milk)	Roybrook Revelation (-3.4 milk)
Raising 3 heifers	$1020	$1020
Number Plus Retained	2	1
Slaughter Value	$ 200	$ 400
Profit on milk sales	$ 300	$ 300
Net Cost	$ 520	$ 320
Cost/heifer starting second lactation	$ 260	$ 320

A Word About Type:

The new Canadian type proofs as now published by the breed associations are in the same form as the percent plus and minus that we have calculated for production. Thus Raymondale Sovereign Master has 49% of his daughters superior to their breed average contemporaries for final classification (not specific herdmates but national herdmates). Fifty-two percent are plus for mammary system. For Roybrook Revelation the percentages are 58 and 55 for final rating and mammary system respectively.

This brings us to the point of what emphasis do we place on type

and production. Yesterday, we said the dairy cow is the foster mother of the human race. Thus it is not for her ornate beauty that she has a place in the world, but as a producer of high quality food. Thus utility is beauty. The concept of using double plus sires (plus production and plus type) may be a conservative middle of the road approach. When in doubt, stick with economics; emphasize the traits in proportion to the revenue you receive as an individual diary farmer.

Summary:

(1) The herdmate-comparison is the most valuable tool we have to estimate the genetic merit of dairy sires.

(2) Revisions in the herdmate-comparison system are necessary from time to time and in no way limits its usefulness.

(3) Comparisons based on two-year old records are good indications of performance in later lactation and life time production.

(4) Heifers minus in their first lactations to herdmates are poor risks for further selection.

(5) We can reduce one of the risks in dairy farming by using the plus proven sire.

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Feeding for Profitable Milk Production

Dr. J. T. Huber

Dept. of Dairy Science
Michigan State University
East Lansing, Michigan

Every successful dairyman has his own particular methods of feeding his cows which results in the profitable production of milk under his conditions. It would be difficult to list a set of rules which would apply to all situations; so I have chosen to discuss several specific areas for consideration which may be helpful to some.

How Much To Feed?

Up to 15 years ago we were in an era of underfeeding of our dairy cows; then the concept of challenge (or lead) feeding was introduced and adopted by many. Challenge feeding meant that the cow was offered grain in accordance with her desire to consume so long as she responded with increased milk, but when production started to decline the feed was also decreased. Basically this was a good concept, but it was misused in many cases where grain was not withdrawn in the later stages of lactation and during the dry period.

Palatability Very Important:

During the first 2-3 months after calving it is usually impossible to get enough feed into high producing cows. This is when the desire to eat is lowest and milk production is

highest. During this period cows should be fed all they will eat of a high quality, palatable ration. A 1500 lb. cow producing 100 lb. milk daily will only consume about 75% of the feed she requires even if allowed to eat at will. This points to the necessity of feeding a ration which the cow likes.

Adequate Roughage Important:

The minimum fiber needed by dairy cows to maintain normal butterfat levels, avoid digestive disturbances and achieve optimum milk production is 15-17% of the ration dry matter. Where corn silage furnishes most of the forage, grain should not make up over 50% of the total ration dry matter. However, this level can be increased to 65% in rations based on legume hay. Depressed fat tests (which are usually a symptom of a roughage deficiency) are also caused when corn silage is too finely ground. An average particle size of between 3/8 and 1/2 inch is ideal and can be achieved by careful attention to knife settings of most field choppers. Passing silage through recutter units results in too fine a chop even though digestibilities may be increased and wastage decreased.

Don't Feed Too Much Grain While Cows Are Dry:

It is a general practice to feed cows grain at 1% or more of body weight starting 3 weeks before calving in order to have them adjusted to the ration they will receive during early lactation. A recent study at MSU showed that feeding 20-25 lb. of grain to cows in moderate condition 3 weeks before calving resulted in more cases of mastitis, metritis and ketosis than

when no grain was fed. Moreover, the extra grain did not cause enough increase in milk production to be profitable. Thus, our recommendation is to not feed grain during the first 6 weeks of the dry period for cows receiving a moderate quality forage. For the 2 weeks before calving grain intake can be built up to about 12 lb./day. As mentioned, very high producing cows are unable to consume enough energy to meet their needs while they are producing over about 75 lb. milk per day, but it is best to feed these exceptional cows extra grain during mid and late lactation because the fat accumulated during the time a cow is milking is used more efficiently to make milk than fat put on the body during the dry period.

Don't Overfatten Cows:

During the past few years there has been a trend towards group feeding of cows where forage and grain are mixed in the feed lot and all cows, regardless of production levels, are allowed to eat at will. This has led to overconsumption of energy and excessive fattening of many animals in late lactation and while dry. The extra fat causes more problems after calving such as ketosis and other metabolic diseases. It appears that many of the "downer cow" cases which have increased greatly in recent years are due to cows carrying too much fat at the time of calving.

Certainly group feeding and other labor saving practices will continue to increase, but a special effort should be made

to separate animals according to their nutrient needs which are determined primarily by their milk production. Some recent experiments in California indicated that high producing cows consuming a complete ration of alfalfa hay and barley (typical of the Western U.S. and Western Canada) will tend to eat in accordance with their energy needs. However, field experience suggests that this is not the case with rations based primarily on shelled corn and corn silage. In fact, dry cows become excessively fat when fed only corn silage supplemented with protein and minerals. In problem herds, where cows appear too fat when turned dry, we recommend they be fed nothing but hay (and this can be medium quality material) during the dry period.

Wise Use of NPN Can Save on Feed Costs:

Bacteria and protozoa in the rumen use ammonia to build protein for their own bodies. This microbial protein is then digested and becomes available to the cow for synthesis of milk, tissue and other uses. When urea is fed to cows it is changed to ammonia which is then used by the microbes. The reason for including urea in cattle rations is to save in the cost of buying protein. Research and field experience shows that dairy cows can consume up to 0.4 lb. urea per day without decreasing milk production. Beyond this level higher producers are more greatly depressed than low producers. A simple comparison shows that 0.4 lb. urea plus 2.6 lb. of corn will replace 3 lb. of soybean meal in a dairy ration which can result in a savings in feed costs of about $30/cow/year.

Precautions for good utilization of urea are: 1) slowly adapt cows to urea-containing feeds over a 2-3 week period. 2) Mix the urea with the total ration (if possible) so it is consumed over the full 24-hour period. 3) Mask the cold, bitter taste of the urea by pre-dissolving in molasses or mixing with silage.

Modifications of urea which cause a slower release of ammonia in the rumen are being studied and show promise for the future. These include: 1) pelleting urea with alfalfa meal (Dehy-100) and 2) mixing with grain during heat gelatinization (Starea).

Ammonia solutions are another improved source of NPN which have shown good results when added to corn silage. Pro-Sil is the trade name of one such solution containing ammonia, molasses and minerals presently being marketed. When added at ensiling time, the Pro-Sil markedly influences fermentation and improves quality of resulting silage. These results are discussed in greater detail in the accompanying paper.

Mineral Supplementation:

Cows consuming large amounts (15 lb./day or more) of legume hay or haylage need no supplemental calcium, but should receive additional phosphorus to bring the Ca:P ratio of the ration down to about 2:1. Several experiments and a great many farm observations have shown an increased incidence of milk fever in herds where Ca:P ratios exceeded 3:1 or were lower than 1:1.

On rations high in corn silage and low in legume hay calcium and phosphorus both need to be supplemented. Our recommendation for such rations is to add 1.5% dicalcium phosphate or steamed bone meal and 0.5% limestone to the concentrate.

Supplementing both types of rations with trace mineralized salt is desirable. Cobalt, iodine and zinc and copper are the trace minerals most often limiting in corn belt rations.

Caution Against Too Dry Silage:

Recent experiments have shown that silages ensiled too dry undergo excessive heating which renders the protein indigestible by the animal and destroys vitamins A and E. The limit for corn silage appears to be about 45% dry matter and for haylage about 50%. Rations which appear to be adequate in the three important nutrients might in reality be deficient and may require supplementing if excessive heating occurred in the silages.

DISEASES OF CATTLE

Fred J. Harden, D.V.M., Head,
Veterinary Services Branch Laboratory
Veterinary Services Branch
Ridgetown, Ontario

Respiratory Diseases of Cattle

The most common respiratory diseases of cattle are Shipping Fever and Infectious Bovine Rhinotracheitis. The fact that both diseases can be confused with one another or may occur together, seriously complicates the problem of diagnosis, treatment and control. Producers buying calves should anticipate trouble and be ready for it. This starts with a clear understanding of each disease and how they may be prevented and controlled.

Shipping Fever

Shipping Fever, sometimes called pasteurellosis or bacterial pneumonia, is most frequently seen in young feeder cattle that have been recently transported during unfavourable fall and winter conditions. It is important to realize, however, that shipping fever can affect both mature and young cattle at any time of the year without ever having been transported. On the other hand, there is no doubt that the stresses of weaning, shipment, excitement, fatigue, overcrowding, changed feeding and watering habits, sales barn handling and a new environment all are predisposing factors which increase the incidence in recently shipped cattle regardless of the distance transported. Recent evidence indicates that a virus plus a bacteria (pasteurella) in addition to stress is necessary for the disease to occur.

Most outbreaks of shipping fever occur during the second week after arrival at the feedlot. The signs are off feed, depression, nasal discharge, rapid shallow breathing and a temperature of 104° F to 107° F.

Prevention of shipping fever must be based on sound management practices. Transport should be as quickly and comfortably as possible. On arrival, animals should be isolated for four weeks and placed in clean, dry, dust-free, comfortable quarters where they can rest quietly. Shelter is preferred with access to an open yard. Feed medium quality hay only for the first week with ample clean water available at all times. Antibiotics, sulfonamides or electrolytes added to the feed or drinking water of calves on arrival are frequently used as a preventative measure for shipping fever. The necessity of this procedure will often depend on the stress to which animals have been exposed during shipment, their health status on arrival, and management conditions at the feedlot. It should not be necessary with healthy calves and good management.

Having made the animal as comfortable as possible, the feedlot operator must then observe them carefully twice each day for at least two weeks. Prompt detection of shipping fever cases is necessary to allow for segregation and early treatment when response is most satisfactory. Most antibiotics and sulfonamides are effective in treating early cases and should be repeated for three consecutive days to avoid relapses and chronic pneumonia cases. A squeeze or system of gates for restraint of sick animals is preferred over roping them.

If there appears to be a large number of animals affected or if early cases fail to respond quickly to treatment (twenty-four hours), then your practicing veterinarian should be called at once for a definite diagnosis and further treatment. Since each feedlot operation has its special set of circumstances relating to housing, feeding and management and since diseases seem to vary according to locale, it is wise to discuss your disease prevention programme with your local veterinarian.

Infectious Bovine Rhinotracheitis (I. B. R.)

This disease is caused by a virus and appears to be increasing in Ontario with all breeds and ages of cattle affected. Most outbreaks occur in the fall and winter months, regardless of the type of management, when animals are being shipped and stabled. It is more common where large groups of feedlot cattle are congregated. Carrier animals are considered to be the main source of infection since the virus is easily destroyed outside the animal's body. The disease occurs anywhere from ten to sixty days after picking up the infection.

In feedlot cattle, the symptoms of I. B. R. are similar to shipping fever but less severe. In addition, there is a harsh dry cough, the muzzle is sometimes reddened, an inflammation of the mucus membrane of the eye may occur with obvious watery discharge, and drooling is evident. Affected cattle show one or all of these signs for approximately ten days and then recover. Some animals, however, develop a secondary bacterial infection which can cause severe weight loss and death. Antibiotic treatment of these cases is necessary. Correctly differentiating I.B.R., shipping fever and I.B.R. plus a secondary bacterial pneumonia is very difficult and requires the services of a veterinarian. Uncomplicated I.B.R. cases do not benefit from treatment and the disease runs its course.

In dairy cattle, the disease is usually less severe. The usual signs include a high temperature, increased respiratory rate and a sudden marked drop in milk production. Milk production usually returns to normal and recovery is complete within one week. Abortion may occur at any stage of gestation in dairy cows which have had an extremely high temperature for three to four days. Also, the virus may invade the uterus and cause abortion without any outward signs being observed in the cow.

Wide disagreement on the value of I.B.R. vaccination in preventing the disease has occurred. Many feedlot operators and veterinarians, however, continue to vaccinate calves. I.B.R. vaccination should be carried out three weeks after their arrival when shipping fever problems have cleared and the animals have settled in. Frequent additions to the herd should be avoided and any new arrivals isolated from the rest of the cattle for four weeks before being mixed. I realize this is difficult for many feedlot operators to do.

The recent introduction of a new Intranasal Bovine Rhinotracheitis Vaccine provides new hope that this disease can be controlled in both beef and dairy cattle. This vaccine now available in Ontario is sprayed into each nostril and is said to give protection in 72 hours. This means that beef cattle can be immunized on arrival at the feedlot. In addition, it will not cause abortions in pregnant animals and, therefore, can be given to dairy cattle without fear of abortion storms. It can also be used on very young calves. Time and experience with this new vaccine will determine its effectiveness and it is hoped that the disease, Infectious Bovine Rhinotracheitis can finally be controlled effectively.

Brain Disorders in Feedlot Cattle

Two disorders of feedlot cattle which are causing operators in Southwestern Ontario some concern this year are Polioencephalomalacia (Polio) and Infectious Thromboembolic Meningoencephalitis (I.T.E.M.E.). Both diseases are very similar and therefore can be easily confused. The early reporting of these conditions to your veterinarian is extremely important so that a correct diagnosis can be established and the right choice of treatment instituted as quickly as possible.

Infectious Thromboembolic Meningoencephalitis (I.T.E.M.E.)

I.T.E.M.E. or Sleeper's Syndrome as it is often called is an acute septicemic bacterial disease. As its name suggests it is an infection of the central nervous system and usually affects something less than 5% of animals in a feedlot. Morbidity rates as high as 30% however have recently been reported in some western Ontario feedlots. The mortality (death) rate in affected animals may be as high as 95% in untreated cases. Affected cattle vary in age from 6 to 18 months but 400 to 500 pound feeder calves are most commonly observed to have the disease.

The course of the disease is very rapid and affected animals often die within 12 to 24 hours after the first signs are noticed. Animals may be found dead without showing any signs of illness. The first signs are stiffness, knuckling at the rear fetlocks, inco-ordination, extension of the head and depression. A few hours later the animal becomes paralysed, goes down and is unconscious before death. Many affected animals are blind and I.T.E.M.E. cases always show a fever varying from 104° to 107° F. This may drop to normal or subnormal in the terminal stages of the disease. Concurrent infection with shipping fever may be evident in the same animal.

Control methods depend on early detection. Cattle treated with penicillin-streptomycin or other broad spectrum antibiotics will respond only if they are treated early. Often antibiotic treatment only prolongs the course of the disease. Also, we have observed animals that survive and regain their appetite but never are able to walk again. In feedlots where the disease is confirmed, all animals should be checked several times each day and affected animals segregated into sick pens and treated. Mass treatment has been carried out in severly affected feedlots.

Polioencephalomalacia (Polio)

This condition is due to a thiamine deficiency within the animal's body. Thiamine is a necessary factor in carbohydrate metabolism. Since the sole source of energy for nervous tissue is the oxidation of carbohydrates, one of the outstanding manifestations of thiamine deficiency is a central nervous system disorder - polioencephalomalacia.

Most diets have sufficient thiamine to supply the needs of cattle. It is now known, however, that certain thiamine destroying enzymes (thiaminase) can find their way into cattle feeds and cause a deficiency of thiamine. The source of thiaminase in cattle is thought to be due to certain fungi and molds. It has been suggested that these fungi and molds may live in the rumen and continue to produce thiaminase thereby destroying dietary thiamine as it is consumed.

The disease can occur in animals of all ages but calves and yearlings are most commonly affected with a morbidity rate usually under 10%. The disease is characterized by sudden onset, blindness and standing with the head held high. The animal usually is separated from the others. In 12 to 24 hours the animal goes down and the head is noticeably stretched over the back. Convulsive episodes will often occur when the animal is stimulated or rolled over. There is no increase in body temperature. Death often occurs in 2 to 4 days after going down. The disease responds rapidly to injections of thiamine often within a few hours if given early in the course of the disease.

FARMYARD MANURE AND CORN PRODUCTION

Dr. C.S. Baldwin,
Head, Soils Division,
Ridgetown College of Agricultural Technology,
Ridgetown, Ontario.

During the last few years there have been many degrading remarks made about the value of farmyard manure. These remarks have ranged from referring to manure as a "necessary evil" to a "low grade form of garbage that is absolutely useless and without value". Such unbecoming statements are very often ill-founded, misleading, and in many cases most untrue.

Manure should be considered as one of our most important by-products in agricultural production. Since it is a perishable product it is all too often subjected to severe nutrient losses.

The relatively large quantities of manure produced on many of our farms have real value as a fertilizer. I believe that too many people tend to treat manure as something to be disposed of, rather than utilized. If our farmyard manure is conserved and handled properly, it could do much to assist in maintaining our crop yields and long-term productivity of our soils as well as solving most, if not all, of our disposal problems.

Production and Composition of Manure

Animals produce relatively large quantities of manure (see Table 1). In looking at the data in this table, it is well to remember that the figures presented are for 1000 pounds of live weight of each of the animal classes rather than on a per animal basis.

Table 1. Quantity of Manure Produced by Livestock
(tons excreted per 1000 pounds of live weight)

Animal	Solid	Liquid	Total (Per Year)
Hen			5
Sheep	4	2	6
Horse	7	2	9
Cow	9	4	13
Swine	9	6	15

The nutrient value of farmyard manure depends upon many factors perhaps some of the most important being:

- kind and age of the animals
- kinds of feed the animals consume
- how the manure is stored and handled, both in the feedlot and in the field

The data presented in Table 2 give the approximate major nutrient value of <u>fresh</u> manure from various animals. Wide variations are often found even from animals within a given class.

Table 2. Approximate Nutrient Composition of Fresh Manure

Animal	Pounds Per Ton		
	N	P_2O_5	K_2O
Hen (Litter)	20	15	10
(No Litter)	30	25	10
Sheep	20	7	20
Horse	14	5	12
Cow	10	4	10
Swine	10	5	10

It is well to remember that in addition to the N,P, and K value of the manure, considerable value also may be found in the organic matter content, the secondary nutrients such as calcium, magnesium, and sulphur, as well as all the micro-nutrients that are required for crop growth.

The nutrient content as indicated in Table 2 is for fresh manure. Thus it should be realized that considerable losses may occur from the time manure is produced until the time it is applied and incorporated in the soil.

Manure should not be spread on frozen ground since it could be very susceptible to runoff, hence the possibility of causing pollution problems. Ideally the best system would allow one to spread the manure each day and immediately incorporate it into the soil. Few farming operations allow such to happen, hence each farmer must take into account the most practical method of handling the manure at his disposal. In calculation of the nutrient value of the manure he must take into account the various possible losses that might have occurred. Manure exposed to the weather loses much of its fertilizer value quite quickly.

Spreader Capacities

Many farmers in talking about the amounts of manure applied very often deal with the number of loads per acre rather than the tons per acre. In his calculation to assess the amount of nutrients applied it should be of interest to know the approx-imate relationship between the spreader capacity in bushels and the tons per load (see Table 3). The number of loads per

acre is of little value in nutrient calculations unless the relationship between bushels and tons is also known. Quick calculations indicate that it takes roughly 50 bushels of manure to equal one ton.

Table 3. Manure Spreader Capacities

Spreader Capacity (rated in bushels)	Equivalent In (Tons per load)
75	1.5
100	2.0
125	2.5
200	4.0
250	5.0
300	6.0

Research Results at Ridgetown

Farmers with farmyard manure "problems" should be very interested in a recently completed research project at the Ridgetown College of Agricultural Technology, Ridgetown, Ontario. In a four-year trial, 1965-1968 corn yields were increased by 40 bushels per acre through a yearly application of 15 tons of barnyard manure (Table 4). The manure under study was fresh steer manure and was plowed down in the fall along with the corn stover.

Table 4. Corn Yields from Manure and Fertilizer (1965-68 R.C.A.T.)

Treatment	Yield (bushels/acre
A - Unmanured	88
B - Manured (15 tons per acre)	128
C - Manured + 10-10-10 @ 1000 pounds per acre	130

The non-manured plots (Treatment A) averaged 88 bushels per acre during the four years, whereas corn grown on the manured plots (Treatment B) averaged 128 bushels per acre. In addition to the manure being compared to the non-manured plots, a treatment was also included to see if an application of commercial fertilizer (Treatment C) along with the manure would further increase the corn yield. As indicated in the table the 1000 pounds of 10-10-10 did not result in any further yield increase. In other words there was no significant yield difference between the plots that received only the manure and the plots that received the manure plus the commercial fertilizer.

An actual dollar value of the manure in this study could easily be calculated. The value per ton of manure depends of course on the price per bushel that is placed on the corn. The data in Table 5 indicate the varying values per ton of manure applied when different market values are assigned to the corn.

Table 5. Dollar Value Per Ton of Manure - Assuming 40 bushel yield response

Corn (price/bushel)	Value of the Manure	
	Total (15 Tons)	Each Ton
$1.00	$40.00	$2.66
$1.25	$50.00	$3.33
$1.50	$60.00	$4.00

In other words the 40-bushel response to the 15 tons of manure would calculate to a dollar value of $4.00 per ton with a corn price of $1.50 per bushel.

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On many farms, most if not all of the fertilizer needs of the corn crop may be met by adequate applications of farmyard manure. Admittedly the handling and utilization of the manure may present some problems, but all factors considered these should be "happy" problems. Farmyard manure is an extremely valuable source of fertilizer with the potential of saving farmers considerable sums of money on their fertilizer cost for corn production. It certainly is not deserving of all the bad publicity that seems so prevalent.

CORN PLANT POPULATION FOR SILAGE

David Beattie
Ridgetown College of Agricultural Technology

It has been recommended in Ontario that the optimum final plant population per acre for corn grown for grain and/or corn silage is 18,000 - 20,000. Many farmers believe that higher populations than this are required to generate optimum corn silage yields per acre probably due to recommendations forthcoming from some parts of the U.S. Confusion existed as to the feeding value of silages made from different plant populations.

An experiment was initiated at Ridgetown College of Agricultural Technology in 1969 with the following objectives:

1) to compare the feeding value of corn silages made from various plant populations, for both beef and dairy cattle.

2) to measure differences in silage yield on a field scale from a corn variety planted at various populations.

Procedure:

In 1969 three ten acre strips in one field were seeded with Pioneer 3773 corn at three different populations (approximately 20,000; 30,000; 45,000 seeds per acre). All strips were fertilized with 360 lbs. 6-24-24 and 200 lbs. actual Nitrogen. Atrazine and Sutan were incorporated pre-plant for weed control purposes.

All strips were randomly sampled to determine:

1) final plant population per acre

2) yield per acre of silage

3) yield per acre of grain corn

4) yield per acre of stover, husks and cobs (on a Dry basis)

The experiment was repeated in 1970, but different plant populations were used (20,000; 25,000; 28,000 seeds per acre). Fertilizer applications, weed control and sampling procedures were identical to those in 1969.

In both 1969 and 1971 all three silages were fed to beef steer calves and lactating dairy cows, to determine any differences between silages from the standpoint of animal performance.

Experimental Results for beef steers

TABLE 1 Crop Yield Data

Plant pop/ac	Dry Matter Yield (Tons/acre) Stover, husks & cobs	Grain	Whole Plant	% Grain	Grain Yield bu/ac (15%DM)	Silage Yield ton/ac (35%DM)
1969 (4 samples/pop.)						
19,700	2.89	2.77	5.67	48.9	116.4	16.2
30,700	2.86	2.50	5.36	46.7	105.0	15.3
46,300	3.18	2.09	5.27	39.6	87.8	15.1
1970 (8 samples/pop.)						
20,700	2.62	2.74	5.36	51.1	115.0	15.3
24,073	2.86	2.72	5.58	48.7	114.3	15.9
27,030	2.76	2.59	5.38	48.1	108.8	15.4

TABLE 2
Steer Feeding Trial 1969 (84 days)

	Group 1	Group 2	Group 3
Population for silage	19,700	30,700	46,300
No. of Animals	16	16	16
Initial Average wt. (lbs)	493	480	488
Final Average wt. (lbs)	707	695	699
Average Daily Gain	2.55	2.57	2.51
Average Feed Intake/steer			
Corn Silage, lbs	22.0	23.8	23.3
Grain Corn	5.7	5.9	5.7
Soybean Meal	1.0	1.0	1.0
Dry Matter	13.5	13.6	13.0
Dry feed/lb gain	5.3	5.3	5.2
Steer Requirements: (to gain 2.4 lbs/day)			
Dry Matter	15.0	15.0	15.0
T D N	10.78	10.78	10.78
Crude Protein	1.80	1.80	1.80
Nutrients Supplied:			
T D N Supplied	10.57	10.84	10.17
Crude Protein	1.52	1.58	1.46

TABLE 3 Feed Analyses (1969-70) Dry Matter Basis

	Dry Matter	T D N (Calculated)	Crude Protein
Silage 1 (19,700)	35	70	7.3
Silage 2 (30,700)	33	70	7.2
Silage 3 (46,300)	30	70	7.6
Dry Shelled Corn	86	91	10.4
Protein Supplement	90	81	49.5

TABLE 4

Steer Feeding Trial 1970 (140 days)

	Group 1	Group 2	Group 3
Population for Silage	20,700	24,073	27,030
No. of Steers	18	18	18
Initial Average wt., lbs	473	486	480
Final Average wt., lbs	766	770	754
Average Daily Gain, lbs	2.10	2.03	1.96
Average Feed Intake/steer			
Corn Silage, lbs	16.0	15.8	14.8
H.M. Grain Corn, lbs	5.6	5.6	5.6
Protein Supp., lbs	0.92	0.92	0.91
Dry Matter	12.1	12.0	11.3
Dry Feed/lb gain	5.8	5.9	5.8
Steer Requirements: (to gain 2.2 lbs/day)			
Dry Matter	13.0	13.0	13.0
T D N, lbs	9.40	9.40	9.40
Crude Protein, lbs	1.48	1.48	1.48
Nutrients Supplied from feed:			
T D N	9.23	9.25	8.85
Crude Protein	1.42	1.40	1.38

TABLE 5 Feed Analyses (1970-1) Dry Matter Basis

	Dry Matter	T D N (Calculated)	Crude Protein
Silage 1 (20,700)	45.8	70	7.7
Silage 2 (24,073)	46.6	70	7.3
Silage 3 (27,030)	45.8	70	7.7
H.M. Corn	67.3	91	10.5
Protein Supplement	90.0	81	49.8

Discussion of Results:

The crop yield data in Table 1 indicates no significant differences in silage yields in either year for the various populations. The percentage grain in the silage decreased, as expected with higher populations.

The feeding experiment in 1969-70 (Table 2) was conducted using 48 Charolais X Angus steers. No significant differences in rate of gain, dry matter intake or feed efficiency were detected. Steers on the high population silage (46,300 plants/acre) consumed slightly less silage dry matter, due probably to the higher moisture content of that silage. Energy intake in Group 3 was lower - due to lower dry matter intake.

In 1970-1, fifty-four Angus and Angus X Hereford steers were used in the experiment. Results (Table 4) show no significant differences in rate of gain, dry matter intake or feed efficiency among groups fed the three silages. The silages used in 1970-1 were drier than is normally recommended due to the very fast drying of the plant in the field at harvest. Intake of silage dry matter, however, was nearly as high as with the silages in the previous year.

Tables 3 and 5 show the analyses of the various ration ingredients in both years.

Dairy trials over 2 years indicate no significant difference in performance of lactating cows on the various silages.

It would appear from these results that there is no benefit, under normal farm conditions, in increasing corn plant populations for silage (over 20,000 plants/acre) as far as animal performance is concerned. Research work being conducted by the Crops Division at Ridgetown College of Agricultural Technology indicates slight increases in silage yields with higher populations than 20,000 plants per acre, but it must be stressed that these increases take place under conditions of almost perfect management - Extremely high fertilizer application, perfect weed control, hand thinning of plants and careful harvesting.

SILAGE ADDITIVES FOR BEEF AND DAIRY CATTLE

Dr. J. T. Huber
Department of Dairy Science
Michigan State University
East Lansing, Michigan

ADDITIONS TO CORN SILAGE:

Corn silage is low in protein and certain minerals. Therefore, additives to correct nutrient deficiencies of cattle fed high silage rations have been studied. The two main sources of nitrogen added to correct the crude protein deficit are urea and ammonia.

UREA:

Additions of 10-15 lb. urea per ton at ensiling time has been a common practice in many areas and raises silage crude protein (on a dry matter basis) from 8-9% for untreated to 13-14% for treated material. This level of urea addition will furnish all of the supplemental nitrogen needed by feedlot cattle, beef cows, dry dairy cows and dairy heifers if they are consuming high levels of the treated corn silage.

Lactating dairy cows need additional protein added to the grain mixture in the form of a natural protein supplement (soybean, cottonseed meal, etc.). About $20-30 per cow can be saved by adding urea to corn silage. This reduced feed cost is dependent upon the farmer reducing the protein in his grain from the 20% needed if no urea were used to about 14%.

AMMONIA SOLUTIONS:

Because ammonia is the central nitrogenous compound for microbial protein synthesis in the rumen, and due to its cheaper price per unit nitrogen than urea, we undertook a study at Michigan State University about four years ago to test the efficacy of adding ammonia solutions directly to silage. Ensiled material was chosen as the preferred feed to carry the ammonia because of its high content of lactic and acetic acids which would serve to bind the ammonia in the form of a salt until consumed by the animal.

From this work an additive for silage containing ammonia, minerals and molasses was formulated. The mineral level of the additive was calculated to correct deficiencies of cattle on high corn silage rations, except the lactating dairy cow which requires additional calcium and phosphorus. This additive was given the trade name of ProSil and excellent results have been obtained in feeding studies with beef and dairy cattle. About 3 to 4 lb. higher milk production on ProSil than urea and control silages was observed for two consecutive years; whereas, in the beef cattle studies the ProSil was equal to or better than urea plus minerals additions.

OTHER NPN ADDITIVES:

A number of other non-protein nitrogen additives such as biuret, di-ammonium phosphate, and several ammonium compounds (chloride sulfate, carbonate, bicarbonate and nitrate) have been added to corn silage but these have met with varying succes

and in general have decreased animal acceptance of the resulting silage. A problem with biuret which doesn't apply to the other compounds is that it is secreted as an unnatural constituent of the milk and has not been approved for use in lactating dairy cattle.

NPN EFFECTS IN SILAGE:

Silage lactic acid and true protein content are increased by ammonia addition and to a lesser extent by adding urea. The reason for these increases is probably due to increased microbes resulting from a buffering by the ammonia. From 30% to 70% of the urea is changed to ammonia in the silo which would also exert some buffering effect. Whether these changes are responsible for the higher milk production on the ProSil-treated silage is presently being studied.

MATURITY AT HARVEST:

Addition of urea or ammonia solutions to corn silage which contains 45% dry matter or more resulted in decreased intakes and lower milk production. In searching for a way to allow NPN uses with mature silages we added formic acid conjointly with the urea at ensiling time and showed that the early acidification completely corrected the poor results obtained.

The formic acid depresses fermentation as indicated by very low silage lactic and acetic acid levels. Presently, we are comparing the effectiveness of formic and propionic acids in high dry matter silages.

MINERAL ADDITIONS:

The addition of 1% $CaCO_3$ to corn silage has resulted in higher lactic acid levels (probably due to buffering) and improved efficiency of gain in beef cattle studies, but rate of gain was not affected. Ohio studies have shown favorable results from addition of a combination of urea and limestone. These additives also correct for the low protein and calcium levels in corn silage.

Several experiments have shown no benefit from adding limestone to rations for lactating dairy cows.

A combination of dicalcium phosphate, sodium sulfate and trace mineralised salt (high Zn) has been combined with urea as an additive to corn silage in Michigan studies. Silage treated with about 1% of a urea-mineral mixture has produced gains in beef cattle superior to those obtained from urea-treated silages to which the minerals were added to the concentrate. In a study with lactating dairy cows, additions of 2% of the urea-mineral mixture to corn silage (the higher level is necessary to meet the increased mineral needs of high producing cows) resulted in decreased feed intakes and lower milk production than urea, ProSil or ammonia additions.

ADDITIONS TO HAY CROP SILAGE:

Direct chopping of the hay crop for silage has usually resulted in heavy seepage losses and unpalatable feed when offered to animals. The decreased palatability was attributed

to a poor fermentation characterized by high acetic and butyric and low lactic acid levels. High concentrations of ammonia and other non-protein nitrogen constituents were also observed which indicated an extensive breakdown of the original plant protein. Wilting the crop to less than 70% moisture materially improves silage quality and prevents losses. However, there are some conditions where wilting may be undesirable or impossible. Certain additives have been developed to correct the undesirable fermentation of direct chopped silage. These have included chemical sterilants such as sodium metabisulfite; antibiotics such as zinc bacitracin; and mineral acids as proposed by the AIV method, but none has been widely accepted.

FORMIC ACID TREATMENT:

Perhaps the most effective method of improving direct cut hay crop silage is the addition of 7-10 lb. formic per ton. The practice was largely developed in Norway during the last decade. For the past two years it was estimated that over 90% of the silage harvested in Norway was treated with formic acid and the practice is growing rapidly in England and Germany. Recent work by USDA workers has shown formic acid treatment of hay crop silage increased weight gains and efficiency of feed utilization in heifers fed the formic-treated silage compared to direct-cut untreated silage.

A great deal of research is currently underway with organic acids in the silage preservation area. Two specific approaches

which may hold future promise are: (1) a combination of formic and propionic acids currently being studied in West Germany and (2) a combination of formic acid and formaldehyde, originally proposed by Finnish workers and under investigation at several locations.

A major drawback to sidespread use of the organic acids on silage crops is their relatively high cost compared to the value of the crop. For instance, 8 lb. of formic acid added to one ton of silage would cost about $1.60 (U.S.); whereas the silage itself is only valued at about $6/ton.

OTHER ADDITIVES TO SILAGE:

There are a number of other silage additives being sold by certain companies which are of doubtful benefit. These usually contain a whole host of ingredients none of which can be in high enough concentrations in silage when added at the suggested rate of application to affect preservation or nutrient content. Claims for these substances are numerous and often vague such as improved odor, decreased seepage, and dry matter losses, fresher silage, etc.

One good rule to apply to all silage additives is to have the salesman show data from controlled experiments, rather than just testimonials.

CONCLUSIONS:

Considerable savings in feed cost can be realized by additions of urea or ammonia solutions to cattle rations.

Corn silages is an ideal vehicle to carry these NPN materials because of its acidic nature. ProSil (an ammonia solution) treatment of silage resulted in higher milk production and equal weight gains compared to urea-treated or control silages. It is not advisable to add urea to corn silage which exceeds 40% dry matter unless acid (formic or propionic) is added conjointly. The dry matter limit of adding ammonia solutions (ProSil) is 45%. However, acidification does not appear to improve corn silage between the optimum dry matter range of 30 and 40%. Calcium, phosphorus, sulfur, salt and trace minerals (Co, I, Cu and Zn) are low in corn silage and should be supplemented to rations where heavy feeding of corn silage is practiced.

Formic acid treatment of direct cut hay crop silages improves their feeding value and decreases dry matter losses, but it appears that the practice may not receive widespread adoption in the U.S. and Canada unless the price of formic acid is reduced. Numerous silage additives are presently being marketed to farmers of doubtful efficiency.

SUMMARY

SOUTHWESTERN ONTARIO FARMERS' WEEK AT RIDGETOWN COLLEGE OF AGRICULTURAL TECHNOLOGY

PROCESSING CROPS
Friday January 14, 1972

ONTARIO DEPARTMENT OF AGRICULTURE & FOOD
PARLIAMENT BUILDINGS, TORONTO

EVERETT BIGGS/DEPUTY MINISTER HON. WM. A. STEWART/MINISTER

FOREWARD

The Southwestern Ontario Farmers' Week is a result of the deliberations of many individuals beginning in early October. Most segments of the agricultural community of Southwestern Ontario are represented with the emphasis on the farming sector.

The sessions containing discussion on current topics of interest to many people are repeated each day so that as many as possible may participate. A summary of each presentation is contained in this booklet. It is hoped that this information will be of use to each and every farmer interested.

Among the organizations responsible for the planning of the 1972 Farmers' Week are:

Soil and Crop Improvement Associations, Milk Committees and Beef Improvement Associations of the Counties of Essex, Kent, Lambton, Elgin and Middlesex

Kent Vegetable Growers' Association

Essex Vegetable Growers' Association

Ontario Bean Producers' Marketing Board

Ontario Soya-bean Growers' Marketing Board

Ontario Department of Agriculture and Food

Harrow Research Station (Canada Department of Agriculture)

We, at the Ridgetown College of Agricultural Technology, are pleased that the planning committee has seen fit to make use of the facilities available here at the College.

If farmers should want to contact research personnel at the Harrow Research Station, or the Ridgetown College of Agricultural Technology, the staffs of both stations are listed with the specific area in which they conduct research.

Harrow Research Station

Canada Department of Agriculture

Department and Personnel	Area of Research
CHEMISTRY AND WEED SCIENCE	
Dr. G .M. Ward	Head of Section Greenhouse vegetable crops. Nutrition, production, biochemistry of tomatoes and cucumbers.
Dr. A.S. Hamill	Effect of herbicides on weed species and weed population shifts, influence of weed competition on crop yields.
Dr. P.B. Marriage	Herbicide physiology and persistence.
Dr. W.J. Saidak	Weeds, weed control, herbicide evaluation and herbicide translocation.
Dr. F.G. von Stryk	Pesticide chemistry. Residue analysis, systemic insecticides, fungicides, herbicides.
CROP SCIENCE	
C.G. Mortimore	Head of Section Corn breeding, stalk rot research, agronomic studies.
L.J. Anderson	Variety testing of corn, soybeans, and cereals.
Dr. J.W. Aylesworth	White bean breeding and production practices.
Dr. B.R. Buttery	Soybean physiology and biochemistry.
Dr. R .I. Buzzell	Soybean breeding and genetics, agronomic studies.
W.A. Scott	Burley tobacco management.
ENTOMOLOGY	
Dr. C.D.F. Miller	Head of Section Cereal and forage crop insects (Cereal leaf beetle - Alfalfa weevil)
Dr. W.M. Elliott	Vegetable insects (peach aphid, Myzus persicae) on potatoes.
Dr. W.H. Foott	Field crop and vegetable insects (Corn leaf aphid - Sap beetle)
Dr. R.P. Jacques	Insect pathology. (Cabbage looper - cabbageworm)
Dr. P.W. Johnson	Plant parasitic nematodes. (Root-knot nematode - lesion nematode on greenhouse vegetables)

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Department and Personnel	Area of Research
Entomology - continued	
Dr. R .J. McClanahan	Greenhouse insects. (Two-spotted spider mite - greenhouse whitefly, integrated control)
H.B. Wressell (Chatham)	Field crop and vegetable insects. (Insects on white beans, corn and tomatoes)
HORTICULTURAL AND SOIL SCIENCE	
Dr. J.M. Fulton	Head of Section The water requirements of crops, soil moisture, irrigation, evapotranspiration.
Dr. E .F. Bolton	Soil physics, cropping systems, cultivation, tillage, soil aeration and drainage.
Dr. W.I. Findlay	Soil fertility maintenance, build up and decline; crop fertilizer requirements, and time of application.
Dr. R.E.C. Layne	Tree fruit breeding. Winterhardiness. Disease resistance. Peach rootstocks.
V.W. Nuttall	Vegetable breeding. Genetics. Greenhouse and pickling cucumber breeding.
Dr. H.A. Quamme	Tree fruit breeding. Fireblight resistance of pear. Cold-hardy dwarfing rootstocks for pear.
PLANT PATHOLOGY	
Dr. C.D. McKeen	Head of Section Greenhouse and field vegetable diseases. Verticillium wilt. Evaluation of fungicides on vegetables.
Dr. B.N. Dhanvantari	Tree fruit diseases. Peach canker, bacterial leaf spot of peaches and apricots. Crown gall.
Dr. John Dueck	Bacterial diseases of fruit and vegetable crops. Fireblight of apple and pear. Bacterial spot of pepper.
Dr. L.F. Gates	Corn root and stalk rot and other corn diseases. Viruses of cereals and legumes.
Dr. J.H. Haas	White bean and soybean diseases. Bacterial blights, bronzing and root rots.
Dr. R.N. Wensley	Soil microbiology. Fusarium wilt and root rot diseases of melons, asparagus and other vegetable crops.

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Ridgetown College of Agricultural Technology

Ontario Department of Agriculture and Food

Department and Personnel	Area of Research
AGRICULTURAL ENGINEERING	
P.H. Bomford	Head of Department. Corn and Soybean harvest losses. Grain drying systems.
R.E. Clayton	Extension engineer (Kent County) in farm buildings, farm drainage and farm machinery.
M. Sojak	Environmental control (ventilation). Drainage systems (durability of plastic drains and drain maintenance. Specialized machinery.
BIOLOGY AND HORTICULTURE (and weed control)	
R.H. Brown	Head of Department. Evaluation of chemical weed control in corn, burley tobacco, asparagus, red beets, tomatoes and strawberries. Control of Quackgrass and fall panicum.
Dr. B. Bolwyn	Insect and disease control in corn (Northern corn blights, rootworm) white beans (white mold).
J.K. Muehmer	Variety evaluation and production techniques in processing crops (sweet corn, tomatoes, peppers, cucumbers).
J.E. Shaw	Evaluation of chemical weed control in soybeans, white beans, kidney beans, lima beans, cereal grains, alfalfa, cucumbers, potatoes. Control of velvetleaf, Jimsonweed, and Black Nightshade.
CROPS	
A.D. McLaren	Head of Department. Variety evaluation and production techniques in corn and forages.
R.C. Jenkinson	Variety evaluation and production techniques in cereals and winter wheat and spring wheat.
D.A. Littlejohns	Variety evaluation and production techniques in soybeans and white beans.
A.K. Brooks	Extension in Crop Production -- Middlesex and Elgin Co.
W.W. Parks	Extension in Crop Production - East Kent and Lambton Counties.

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Department and Personnel	Area of Research
FARM MANAGEMENT AND ECONOMICS	
D. Beattie	Head of Department, Farm management and production economics of livestock.
S.J. Usher	Marketing agricultural products, agricultural policies, economics in swine production.
LIVESTOCK AND POULTRY	
D.G. Luckham	Head of Department. Nutrition and egg production, feeding broiler hatching flocks.
J.E. Core	Beef and Dairy rations. Stored feeding programs including stover silage, silage additives.
A.A. Campbell	Chemical components of feed.
J.R. Morris	Selection of swine breeding stock, herd health. Evaluation of additives (protein supplements, antibiotics.) Feeding of high moisture corn stored with organic acid to finishing hogs.
SOILS	
Dr. C.S. Baldwin	Head of Department. Plastic coated corn and spring wheat, nitrogen in spring wheat and white bean production.
R.W. Johnston	Calcium, magnesium, and micronutrients in field crops (corn, soybeans, white beans, and forages).
C.K. Stevenson	Evaluation of nitrification inhibitiors in the nitrogen fertilization of corn. Soil fertility maintenance, time of application of fertilizers.
VETERINARY SERVICES LABORATORY	
Dr. F.J. Harden	Head of Department. Assistance given in diseases of all classes of livestock.
Dr. R.E. Clugston	Assistance given in diseases of all classes of livestock.
Dr. D.A. Stevenson	Assistance given in diseases of all classes of livestock.
AGRICULTURAL LABORATORY TECHNOLOGY	
Dr. J.H. Brimner	Coordinator of course, chemical components of crops and feeds.
AGRICULTURAL SECRETARY	
R.C. Wagner	Coordinator of course. Farm accounting and agricultural policy.

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TILLAGE FOR PROCESSING TOMATOES ON CLAY SOILS

Dr. E. F. Bolton
Research Station, Harrow, Ontario

Much of the cultural research work related to processing tomatoes has been located on clay soils since most of the tomato acreage is located on fine-textured soils of Essex and Kent. Results presented in this discussion will refer to work on clay soil most of which was carried out at the Soil Substation, Woodslee.

Tomatoes require good soil physical conditions to produce high yields. Research results from Woodslee have shown that good soil physical condition is most important for tomatoes during seasons when growing conditions are generally poor such as occurs in excessively wet or dry years. Tomatoes are more sensitive to dry and wet conditions than some crops and when growing tomatoes we attempt to select sites and to prepare the soil so as to provide the most favorable conditions. During the stress years yields can be increased by several tons per acre as a result of improved soil physical conditions. Since all yields tend to be low in stress years increased yield resulting from improved soil condition can make the difference between profit and loss.

A soil in good physical condition is loose and crumbly and easy to work while one in poor physical condition is hard and compacted and will work up into large clods. Cropping system, weather, and tillage are three means of changing soil physical condition for the better if these factors are utilized properly.

It is generally agreed that fall plowing is best for row crops, especially tomatoes. An experiment was established at Woodlsee in 1968 to determine whether deep or shallow plowing is better for tomatoes. Three plowing treatments, 4 -, 8 - and 12 - inch depths were carried out in the fall in addition to the same treatments established on separate plots in the spring. During

the first two years in 1968 and 1969 the tests were ruined by flooding and the data was of little value except to indicate that depth of plowing was no prevention against severe flooding on tomatoes.

The most definite response to plowing depth occurred in 1971 when fall plowing at 12 inches produced 2 tons per acre more tomatoes than plowing at shallower depths. The seasons during which this test was conducted were not conducive to satisfactory experiments and these tests will be continued for at least two more seasons before sound recommendations could be made regarding any change from the present depth of 8 inches.

Work is also underway at Woodslee to see if cultivation is necessary for tomatoes on clay soil where weeds have been controlled by chemicals. In these experiments chemicals are used as an overall treatment to control weeds on all plots. Cultivation treatments were used in addition to chemical weed control and on the uncultivated check treatment all weed escapes were removed by hand. Shallow cultivation increased yield by close to 2 tons of tomatoes per acre compared with yield on the uncultivated check. At the same time deep cultivation at 3 - 4 inches reduced yield below that obtained on the check.

Results of the cultivation test indicate that for clay soil cultivation should be used in combination with chemical weed control to obtain top tomato yields. Cultivation should not be used in place of chemical weed control. Chemicals are already available to provide a high degree of weed control on tomatoes and better materials are constantly being introduced.

Reference has been made to soil flooding and undoubtedly tomato growers from clay soils will agree that soil flooding is one of the most serious risks in growing tomatoes. Good drainage, fall plowing, crop rotation and adequate fertility are all factors that will help growth and offer some protection against flooding. The effects of these factors are quite limited,

however, in the face of severe flooding. Research at Woodslee has shown that black plastic mulch is the only method of successfully combatting extensive flooded conditions. In 1969 for example when yields on some treatments averaged less than 2 tons per acre yields under black plastic were 18 tons per acre. There is some difficulty in planting and applying black plastic mulch simultaneously. The rewards to be gained, however, are stimulating interest and research towards the use of this material.

FIELD-SEEDING AND MACHINE HARVEST

FUTURE AND IMPLICATIONS

Sharad C. Phatak

Horticultural Experiment Station, Simcoe, Ontario

Field seeding and machine harvesting of processing tomatoes are being discussed very often in the last few years. Implementation of this complete mechanization of processing tomato industry has been very slow in Ontario. Midwestern and Eastern United States are also not much ahead in direct seeding and mechanized harvest.

In 1971, California growers field seeded and mechanically harvested all processing tomatoes. About 10% of processing tomatoes was direct seeded in Midwestern and Eastern United States and approximately 15% of the total acreage was machine harvested. In contrast, except for research-demonstration plots, no direct seeding of processing tomatoes was done in Ontario. Less than 2% of total processing tomato acreage was harvested by machine.

In Ontario growers and processors have yet to realize the importance of field seeding in complete mechanization of processing tomato industry. Unless tried on a commercial scale, the advantages gained from field seeding will not have its impact on the growers as well as processors. A few advantages are: (1) More flexibility in establishing optimum stand for once-over machine harvest; (2) lower cost per acre (saving of $45 to $50 per acre); (3) Disease free seedlings; (4) Completion of seeding earlier in the season; (5) No need for additional help for transplanting, and (6) better quality fruits in mid-September.

Field seeding in Ontario will come but slowly. About 5% of the processing tomato acreage will be field seeded in and around 1975.

Full processor-grower co-operation will be essential to go in this direction.

In fall of 1970 it was repeatedly mentioned that there will be no machine harvesting of tomatoes in Ontario for a few years to come. However, four machines harvested over 300 acres in 1971. Machines are very much here to stay. Probably between 2000 to 5000 acres of processing tomatoes will be harvested by machines in 1975.

Implications

1. Definite reduction in the cost of production by field-seeding.
2. Reduction in harvesting cost for efficient growers harvesting 70 to 90 acres per machine.
3. Increase in acreage of varieties suitable for machine harvest.
4. Increase in field seeded acreage.
5. Possible change in processed products.
6. Increase in number of acres contracted to an individual-as minimum of 49 acres per machine must be harvested for economically feasible investment.
7. Smaller growers stand less chances of survival.
8. Reduction in quality of raw product (tomato fruits) delivered to the factory.
9. Possibility of elimination of quota restrictions.
10. Production may slowly move to a lighter soil type but may not move out of Kent and Essex counties.

VARIETY EVALUATION OF PROCESSING TOMATOES

J.K. Muehmer, Horticulture and Biology Division
Ridgetown College of Agricultural Technology
Ridgetown, Ontario

More than 60% of Canadians are urban dwellers and consider the "old farm" as something eternal, something that never changes. But as we live in times of fast change, the farmstead is not sacred or detached from the rest of the country, but agriculture is affected by the changes more than many other phases of industry.

Production figures alone should open a city dweller's eyes when told that wheat yields have increased by 89%, soybeans 13%, and tomatoes 143% in the past 20 years. During this time the average farmer has increased his productivity by 22[illegible]%. In 1820 he supplied food for 4.1 people, in 1900 for 6.9, in 1950 for 15.5 fellow countrymen and this has tripled to 45.3 persons in 1970.

Economic pressures have forced the producer of vegetable crops in particular, to be most progressive and to use his ingenuity to streamline his operation in order to maintain his position on the marketplace. Besides good management practices the vegetable grower has to rely on high yielding, good quality varieties adapted to high density plantings and field seeding, with resistance not only to diseases but to insects and pollution.

Public and private plant breeders all over the world already have come up with a fair number of new cultivars which meet some or most of the above mentioned requirements, incorporating also increased solids, consistency, proper pH and viscosity to satisfy the needs of the processors.

For years the thinking of our Ontario research group has been to find cultivars suited for a special product, and to fit a specific area or market need, respectively. Quality improvements, such as better internal and

external color, flavor and firmness are sought, combined with holding ability and crack resistance.

In recent years the following developments have lead to the introduction of some tomato cultivars suited for Ontario, the American Midwest and the Great Lakes States:

1) Incorporation of the jointless gene (j_2) into already existing experimental plant material eliminated the need for stemming.

2) The use of the self pruning (sp) character resulted in our present commercial varieties having a compact plant habit thus allowing closer spacings.

3) The uniform green (u or ug) genes eliminated the problems of shoulder burn, sun scorch, leather-end, etc. caused by the commonly found dark green shoulder of the "old-timers".

4) The incorporation of the crimson (Og_c) and high pigment (hp) genes into many commercial cultivars lead to the color intensities now encountered.

Several other important genetic characters, too numerous to mention, found their way into commercial tomato varieties. Researchers selected for cold setting ability, earliness and firmness combined with concentrated fruit set especially for Ontario conditions.

Certainly most growers are familiar with the coordinated processing tomato testing programme across the tomato production areas of Ontario. The results are the base for variety recommendations in Publication 363. For three years now additional cultivar testing areas in S.W. Ontario in the form of demonstration plots have been established to benefit the industry.

Table 1 and 2 give the results of the 1971 Trials with additional information in Table 3 on field seeded plots in Kent County.

During the last 3 years the following cultivars have shown excellence in several characteristics and can be recommended for Southern Ontario in particular:

For Handpick:	Remarks
1. Veeset (Vineland)	Early midseason, heavy setting, 4.0 oz/fruit, good foliage, yields well above 25 ton/A. Gives full stand when field seeded. High juice color and flavor. Good for whole-pack also.
2. H-1630 (H.J. Heinz Co.)	Two days later than Veeset, 3.7 oz/fruit, good color and flavor in juice; poor whole-pack color and lots to trim.
3. V-686 (Vineland)	Early yielder, 5 oz/fruit, better than average juice color and consistency, little trim in whole-pack.
4. Ottawa-78 (CEF Ottawa)	Midseason; 3.8 oz/fruit, well colored fruit, good vine cover. Very good juicer. No yellow top; free from cracks in 1971.
5. C-28 (Campbell Soup Co.)	Five days before H-1350 season, compact habit, 4.0 oz/fruit, tendency for blotch. Field seeds well. Heavy yielder. Deep juice color and good flavor. Good for whole-pack.
6. VW14A (Vineland)	For trial? Midseason, 4.1 oz/fruit, no cracks. Excellent vine.

There were several other cultivars showing promise in one or more facets, the author will gladly give details to interested parties.

The "Roma-type" (paste) tomatoes gained increased importance in recent

years and are of particular interest to processors not only for paste products but for a specialty whole-pack. With the advent of mechanical harvest this and similar fruit types seem most suited to withstand the rougher handling by pick-up mechanisms and conveyor belts on once-over harvesters.

Of special merit were the following:

<u>Paste-type (Machine Harvest)</u>

V-704 (Vineland)	3-4 days earlier than Roma V.F., better color, more fruit concentration, 2.0 oz/fruit. Outyielded others when field seeded. Color + consistency in juice very good. Excellent for whole-pack.
H-1706 (H.J. Heinz Co.)	<u>Very early</u>, heavy yielder, tendency for small fruit (1.9 oz/fruit). Good for field seeding. Color, flavor and consistency of juice excellent. Very good for whole-pack.
Chico III	Roma season, high N will give puffy fruit, 2.3 oz/fruit. Consistent producer; color good. Makes good whole-pack.
69B-278 (Beltsville)	Roma season, heavy yielder, deep round fruit, 4.5 oz/fruit, machineable. No cracks, jointless; fairly large vine.

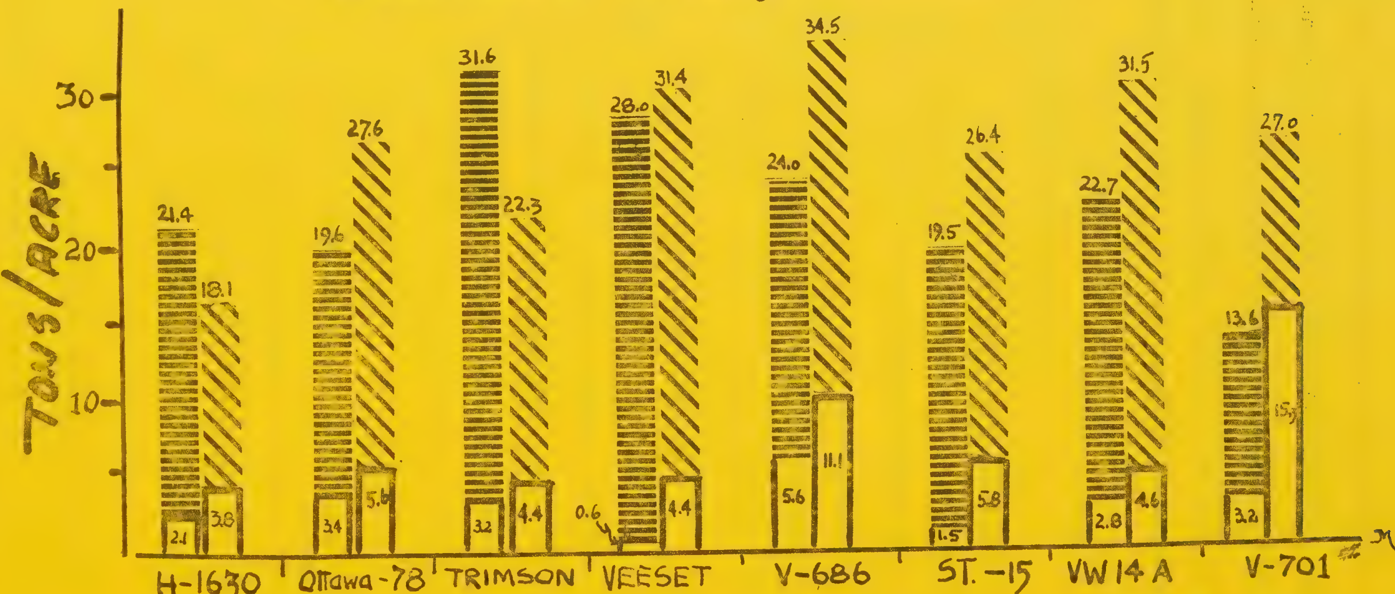
The field seeding of these paste lines seems promising. It appears most practical on lighter soils in conjunction with mechanical harvest. Many aspects of this technique for our region have been studied in recent years, and definite recommendations for management practices will hopefully be available in the near future.

The joint efforts of private and public plant breeders at various institutions during recent years in particular, have resulted in many new

introductions at an advanced testing stage. Some of the cultivars will appear on a commercial scale already in 1972 plantings. One can be confident that plant breeders and management specialists are constantly working to keep the Ontario grower competitive and maintain his reputation as producer of the best quality tomatoes on the market.

TABLE 1

R.C.A.T.
1971
Southwestern Ontario
PROCESSING Tomato Trial
(HANDPICK LINES)



— IN COOPERATION W. KENT & ESSEX VEG. GROW. ASSOC. —

TABLE 2

C-7

R.L.A.T.

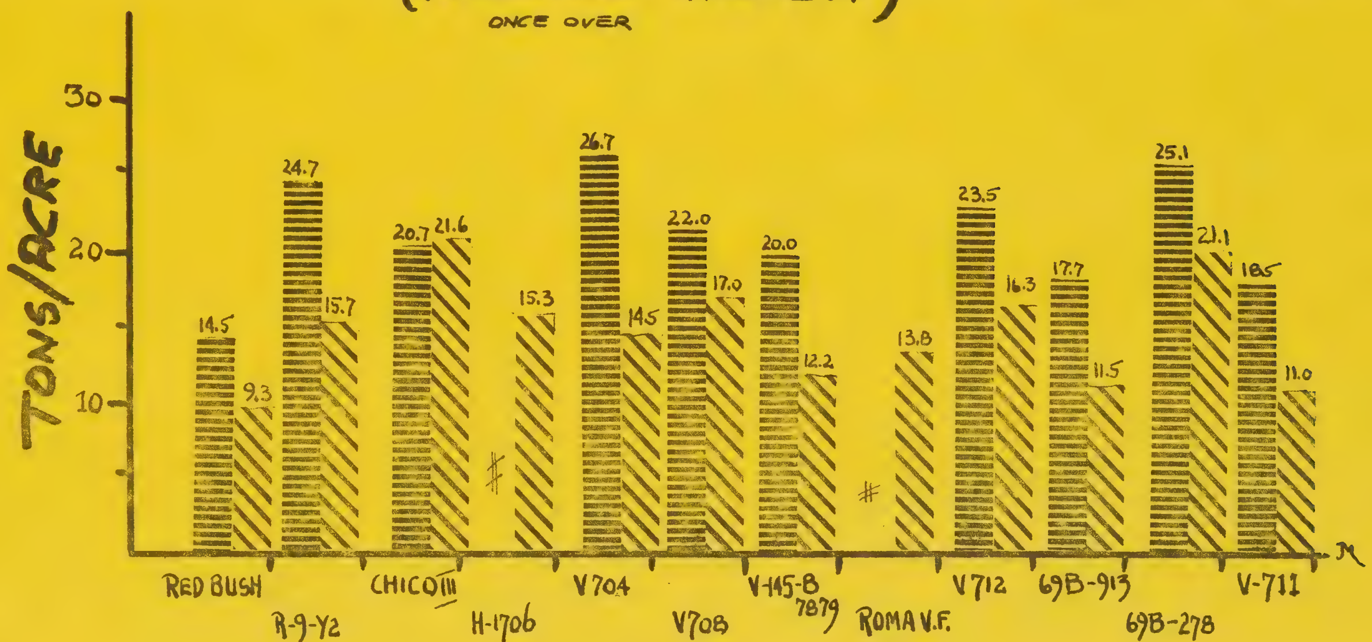
1971

S.W. ONTARIO

PROCESSING Tomato Trial

(MACHINE HARVEST)

ONCE OVER



IN COOPERATION

W. KENT & ESSEX VEG. GROW. ASSOC.

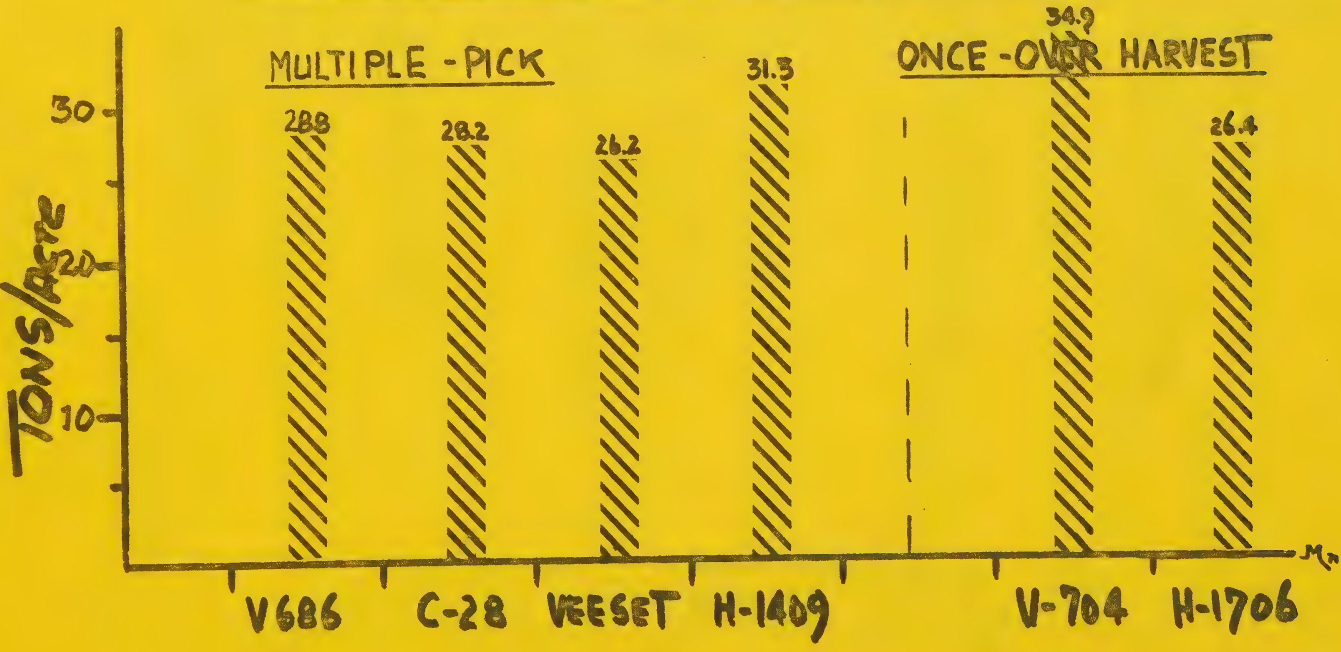
TABLE: 3

R.C.A.T.

1971

S.W. Ontario FIELD SEEDED (April 28, 1971)

PROCESSING TOMATO TRIAL



IN COOPERATION WITH

KENT VEG. GROWER ASSOC.

PROBLEM INSECTS IN VEGETABLE CROPS

A. Cole Crop Insects

Dr. R. P. Jaques

Research Station, Harrow, Ontario

There are four important pests of cole crops in southwestern Ontario — root maggots, aphids, imported cabbageworm, and cabbage looper. Of these only the cabbage looper qualifies as a "problem insect" because of the difficulty in controlling it.

Root maggots have been problem insects but satisfactory control measures are now available. Likewise aphids are readily controlled.

The imported cabbageworm has the potential to cause extensive damage particularly early in the season and it is the principal pest of early cabbage and cauliflower. The cabbageworm is controlled with endosulfan, methomyl, _Bacillus thuringiensis_, or Fundal.

The cabbage looper was not a major pest in southwestern Ontario until 1967 or 1968. By 1969 it was a real problem for growers of late cole crops, spinach, and tomatoes because large larvae of the looper were difficult, if not impossible, to kill with the insecticides available at the time. Methomyl, endosulfan, Fundal, and _Bacillus thuringiensis_ are currently recommended for control of the looper. They do not give acceptable control under all conditions, however.

Extensive tests are being carried out on the use of viruses for control of the cabbage looper and cabbageworm. Both viruses have proven to be highly effective insecticides. The results with the looper virus are particularly significant because of the inadequate performance of materials currently available for control of this problem insect.

PROBLEM INSECTS IN VEGETABLE CROPS

B. EUROPEAN CORN BORER IN SWEET CORN AND PEPPER

R. J. McClanahan
Research Station, Harrow, Ontario

In Kent and Essex County the European corn borer has been an increasing problem on sweet corn and peppers. The corn borer numbers have been quite high the last few years and conditions have been favourable for the second generation. Most sweet corn varieties show little or no tolerance to corn borer infestation and the Seneca varieties are about the most susceptible. In peppers the problem is difficult because the newly-hatched larvae move directly into the pepper fruit. Pepper plants remain susceptible to infestation for several months, and the harvesting is continuous through August and September.

At the Research Station in Harrow, corn borer control has been studied for 3 years in both pepper and sweet corn. Laboratory experiments have established the comparative effectiveness of various insecticides against eggs and larvae. In 1971 a cooperative growers' trial of borer control in peppers was followed closely to determine the degree of infestation and how well spray schedules with Sevin kept the damage under control.

There are 3 important rules to remember for good corn borer control. Firstly, spraying must be started on time. For corn, this means when the eggs are hatching on the leaves, about June 17 in Harrow. In peppers, the sprays should start when the second generation moths emerge about the end of July. If the first spray is missed, eggs will hatch and larvae will burrow under the cap of the pepper fruit. The larvae cannot be killed once they are in the pepper. Secondly, a good spray interval must be followed.

This may be twice weekly when the corn borer is severe, or a 5 day schedule may be sufficient where the numbers are not so high, or the night temperatures are lower than in Essex County. Lastly, coverage must be complete. Eggs are laid under the leaves and this is the area where larvae start to move around. An air-blast sprayer will do as good a job as a row-crop sprayer, but do not try to cover too many rows.

The only recommended spray material is carbaryl or Sevin. Other materials have given good control at Harrow, but other factors must be considered before the companies involved will register the use on corn or peppers.

THE ECONOMICS OF THE USE OF PICKING AIDS IN THE CUCUMBER HARVEST IN ONTARIO

G.A. Fisher, Farm Economics, Co-operatives & Statistics Branch, Ontario Department of Agriculture & Food

The scarcity and the uncertain supply of a dependable labor supply along with increasing wages, has contributed to the interest in the use of more picking aids in the cucumber harvest. The dictionary tells us that an "aid" is"that which promotes or helps in getting something done". This definition very aptly describes the place of picking aids and their use in the cucumber harvest. Without going into all the specifications of construction, these harvesting aids are simply mechanical conveniences on which the workers ride and perform the function of removing the cucumbers from the vines. They place the cucumbers in boxes or baskets as these self-propelled machines move slowly through the field. These picking aids vary in size and carry from one person up to nine or more per machine, depending on the number of people picking from each row. Most growers use only one person per row. Some growers built their own aids, while others purchased factory built machines.

The average yields per acre from those crops that were picked by use of aids was 9.32 tons, and from the fields picked by walking pickers was 9.24 tons per acre. The total labor hours required to pick and load for delivery of one acre of cucumbers with use of an aid, averaged 253 hours. In order to pick and load a slightly smaller yield per acre, walking pickers required 272 hours per acre.

Average harvesting costs per acre using aids was $414 as compared to $399 for walking pickers. On a per ton basis, average harvesting costs were $44.40 for aid picked cucumbers, and $43.20 for those picked by walking pickers.

Some Observations and Comments on Use of Harvesting Aids in the Cucumber Harvest

Although there was little difference in total harvesting costs per ton between aid-picked and cucumbers picked by walking pickers, $44.40 per ton for the former, and $43.20 for the latter, there appeared to be other

A Comparison of Processing Cucumber Harvesting Costs Between Walking Pickers and Use of Harvesting Aids in Southern Ontario, 1970

	Using Aid		Walking pickers	
Number of farms	7		14	
Acres per farm	6.5		5.5	
Marketed yield/acre, tons	9.32		9.24	
Harvesting labor hours/acre	253		272	
Average Harvesting Costs, dollars				
	Per acre	Per ton	Per acre	Per ton
Labor costs				
Family	77	8.31	25	2.69
Hired	296	31.71	366	39.57
Total labor costs	373	40.02	391	42.26
Tractor costs	7	.69	4	.47
Machine costs	34	3.69	4	.47
TOTAL HARVESTING COSTS	414	44.40	399	43.20

advantages for use of harvesting aids.

1. Less damage to vines and disease does not appear to spread as rapidly in fields where aids are used. Walking pickers, if they are careless, crush the vines and do much damage as they move over the field.

2. When using an aid, the entire picking crew is in one location, which allows for better and more exact supervision. Problems may exist in selecting a picking crew that will be able to work effectively together. Also, it may be difficult to arrive at a pay rate that is satisfactory to everyone.

3. When an aid is used, the field is covered a little quicker. This means the field can be gone over more often in a season.

4. It is possible to get better production from the average worker when an aid is used, but the above average picker will be held back to the picking rate of the slowest worker on the aid.

5. Pickers remain more rested when working on an aid and appear to be able to work at a steadier pace. This is especially the case when children are used as it is difficult for them to walk and lift the filled baskets all day.

6. The full baskets of cucumbers remain on the aid and are transported to the end of the field. This speeds up loading and makes it unnecessary to make extra trips through the field to pick up the filled baskets as is done when walking pickers are used.

OPINION FOR HARVESTING METHODS IN PICKLING CUCUMBERS

Dan Cantliffe
Horticultural Experiment Station, Simcoe, Ontario

Cucumber production in Ontario has greatly expanded in the last 5 years. In 1964 the Ontario grower was getting 136 bu/acre of pickling cucumbers while in 1969 he was getting 290 bu/acre. Farm value increased during the same period from $1.8 million to $3.4 million. This means that in 5 years cucumber production doubled in Ontario. Consumer demand grows at approximately 5% per year.

Pickles are a profitable crop although they are generally grown as a small acreage crop (about 2 acres per grower). About 70% of the costs of production for cucumbers goes to labor. At present Ontario growers have no labor shortages. Harvest aids utilizing relatively cheap high school labor and share cropping where pickers contract to harvest the crop for as much as 50% of the gross returns have both helped to combat the labor problem and leave the grower with a profit.

<u>The Future</u>:

Growers have no control of wage costs, the economy determines this. The government is presently trying to help the small farmer die a natural death. The 2 acre grower will be a thing of the past. The housewife will decide it's no longer profitable or fashionable to grow a 1/2 acre of cucumbers. The high school student may not want to pick cucumbers because it's "dirty work." He also may go on a 12 month school year. Present labor demands will not make it possible to pay the high school student higher wages. A fair percentage of the Ontario crop is harvested by Caribbean labor. This could be stopped at any time, especially with increased unemployment within Canada. Minimum wages could force the

amount paid to harvest the cucumbers far above the amount received.

For similar reasons many states in the U.S. found themselves forced into an alternative, mechanical harvesting. Some states such as New York did not convert and went out of production. Presently, there is no danger of import competition from the states. However, when mechanical harvesting is perfected than this situation may no longer hold. On a multipick operation Ontario can outyield Michigan. I believe this to be true for once-over mechanical harvesting. This is why the Ontario Department of Agriculture and Food is spending a lot of time and money to perfect once-over mechanical harvesting for Ontario cucumber growers. The change over to this harvest method is altogether different from present production practices. Good efficient harvesters are available. It's up to the grower whether or not he wants to remain in the past or progress and survive in the future.

AIR POLLUTION DAMAGE TO VEGETABLE CROPS

Douglas P. Ormrod
University of Guelph, Guelph, Ontario

Contaminated air has been with us for a long time. First, there was pollution due to natural phenomena such as dust storms, volcanic eruptions, and forest and prairie fires. Later, human activity began to make important contributions to air pollution. Increasing urbanization and industrialization in Ontario, as elsewhere, are resulting in air pollution on a scale which affects plant growth.

Air pollutants may be gases mixed in the air, or small solid or liquid particles dispersed in the air. The most widely recognized pollutants are the familiar products of combustion: carbon monoxide, oxides of sulfur and nitrogen, hydrocarbons, and particulates. Others are metal dusts, fluorides, asbestos and salt sprays.

Hydrocarbons and nitrogen oxides, when mixed in the atmosphere and illuminated by sunlight, form ozone and a variety of complex organic gases and particulates known as "photochemical smog". Estimated annual crop loss due to air pollution in the United States, for example, has been put at $500-million, 25% of which is sustained by the State of California alone. Studies by Weaver, and by Mcdowall, and their associates, about 6 years ago, pointed to economic losses particularly resulting from air pollution damage to tobacco and white beans in Southwestern Ontario. Vegetable crops are often the first to show evidence that a community or a region has an air pollution problem. Such vegetable crops as beans, onions, tomatoes and potatoes have been widely reported to be very sensitive

to most classes of air pollutants. The typical symptom of ozone damage is generally an upper leaf surface flecking and bleaching, but the symptoms vary from species to species, and with age of the plant. On potatoes, injury may be more evident on the lower leaf surface. With peroxyacetyl nitrate (PAN), another oxidant type of air pollutant, the injury is primarily a glazing or bronzing of the lower leaf surface. Sulfur dioxide causes characteristic interveinal bleaching and necrosis on both leaf surfaces.

Our research program at the University of Guelph emphasizes the study of relative susceptibility of different crop plants as well as those of different varieties to ozone and to sulfur dioxide. In potato, the variety "Norland" is extremely susceptible to damage, while other varieties like "Superior" and "Kennebec" are quite resistant. Similar differential susceptibilities have been found between bean, cucumber and onion varieties. The relatively tolerant varieties of onion are "Downing Yellow Globe" and "Autumn Spice", while "Polaris 135" is a fairly tolerant cucumber. As a rule, white "Seaway" beans are more sensitive than "Blue Lake" which are in turn more sensitive than "Red Kidney" beans.

Air pollution damage to plants is a function of the concentration of the pollutants in the atmosphere as well as the duration of exposure of the plants. However, certain environmental factors have been found to play a major role in the preconditioning or predisposing of plants to damage. For example, high temperature,

high relative humidity, high light intensity, luxuriant usage of nitrogen fertilizer, and luxuriant supply of water, all contribute to greater damage.

Because air pollutants are causing substantial economic losses to Ontario vegetable growers, we must address ourselves to the problem of reducing the damage. Attempts have been mady by spraying certain chemicals, particularly ascorbic acid (Vitamin C) and some organic chemicals containing sulfur, on leaves, with varying degrees of success. This approach has not been widely adopted because of increased cost of crop production, as well as the deleterious effects of the chemicals on product quality and consumer acceptance. The more practically feasible approach is the use of resistant or well-adapted varieties.

Although antipollution devices are being widely adopted in industry, the problem of atmospheric pollutants which damage crop plants will be with us for many years to come. We must be able to recognize more accurately the cause and nature of injury to many more vegetable crops. Economic losses can be reduced by having plant breeders increase tolerance to air pollution during the development of new varieties with other needed desirable characteristics.